United States Department of Agriculture

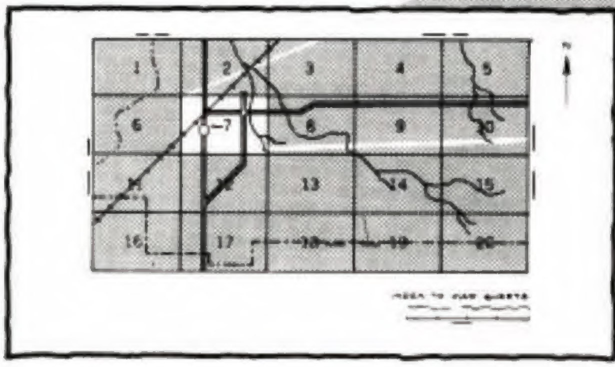
Soil Conservation Service

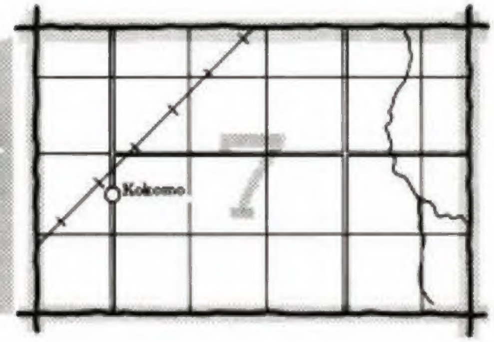
In cooperation with University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations and Soil Science Department, and Florida Department of Agriculture and Consumer Services

Soil Survey of Hillsborough County, Florida

HOW TO USE

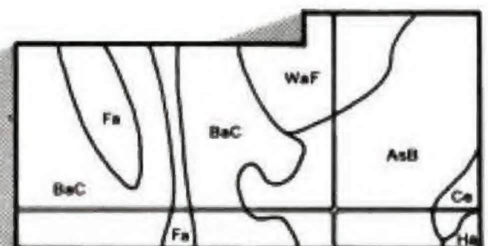
1. Locate your area of interest on the "Index to Map Sheets"



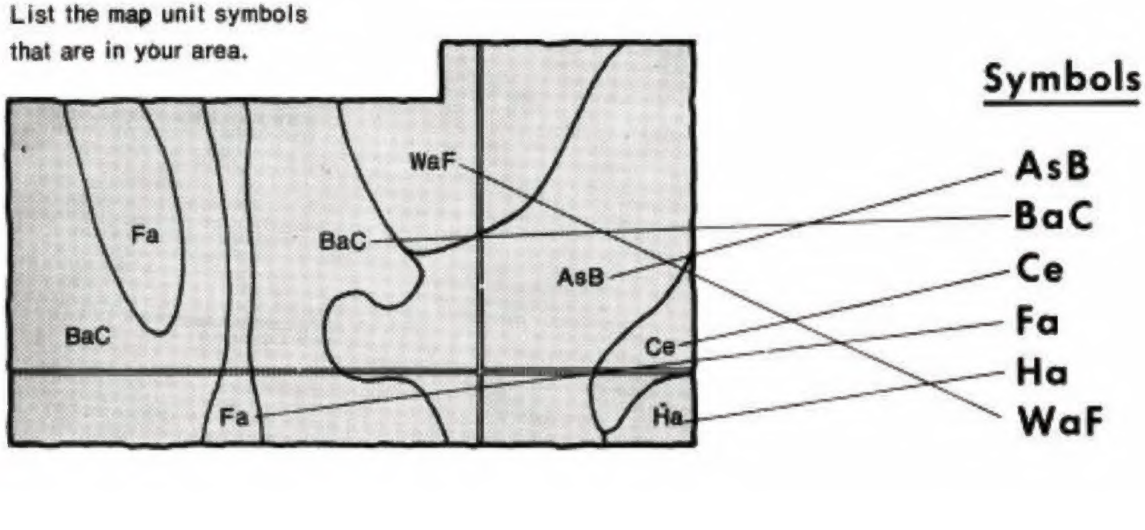


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

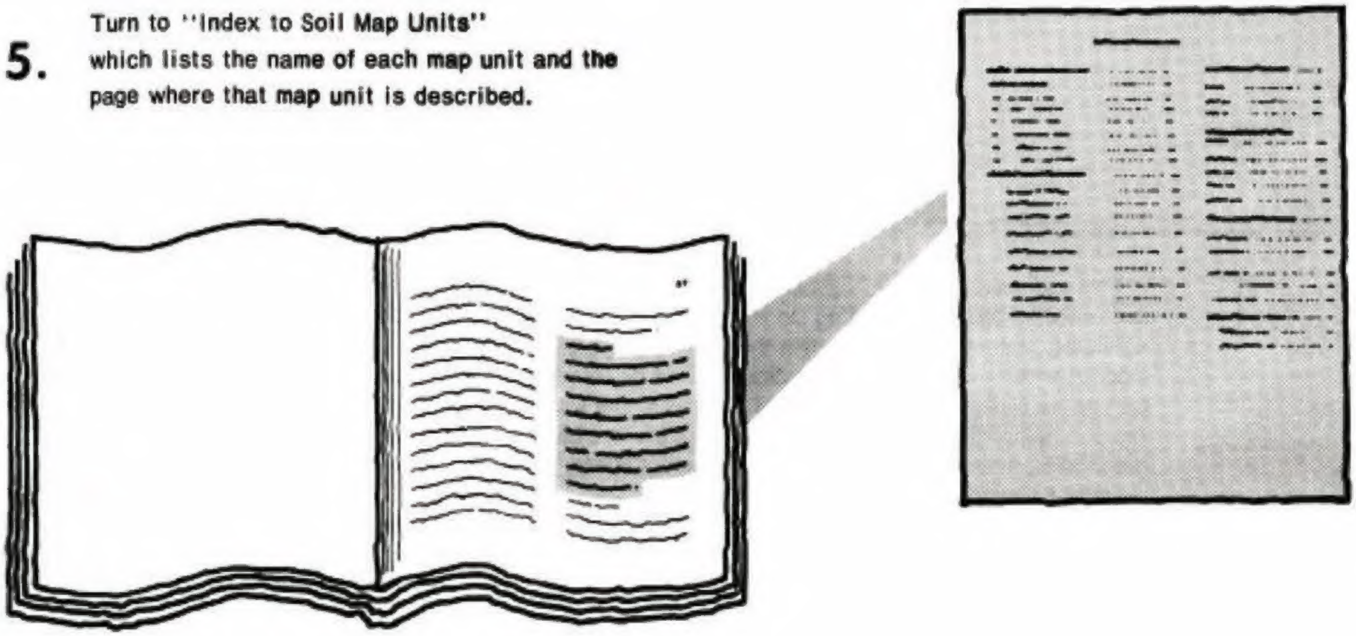


4. List the map unit symbols that are in your area.

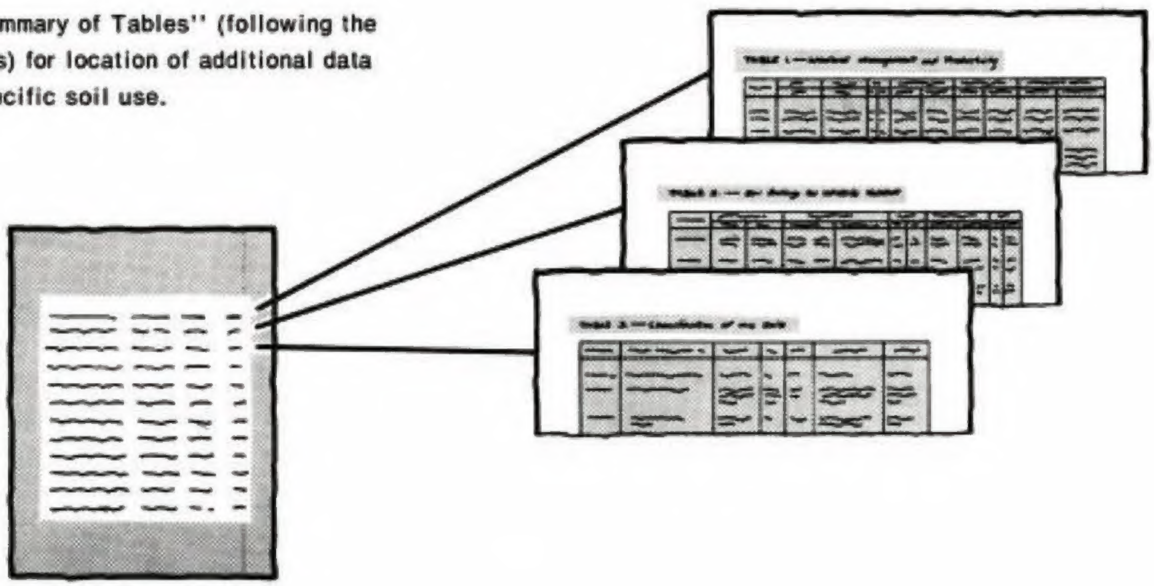


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1950. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983. This soil survey was made cooperatively by the Soil Conservation Service and the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations and Soil Science Department, and Florida Department of Agriculture and Consumer Services. It is part of the technical assistance furnished to the Hillsborough County Soil and Water Conservation District. The Hillsborough County Board of Commissioners contributed financially to the acceleration of the survey.

Some of the boundaries on the soil maps of Hillsborough County do not match those on the soil maps of adjacent counties, and some of the soil names and descriptions do not fully agree. The differences are the result of improvements in the classification of soils, particularly modification or refinements in soil series concepts. Also, there may be differences in the intensity of mapping or in the extent of the soils within the county.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

This survey supersedes the soil survey of Hillsborough County published in 1958 *(14)*.

Cover: Tampa's skyline showcases a modern, progressive city on Florida's Suncoast. This urban area is built on Myakka soil that has been altered for building site development.

Contents

Soil Series

Issued May 1989

Index to Map Units

Summary of Tables

Foreword

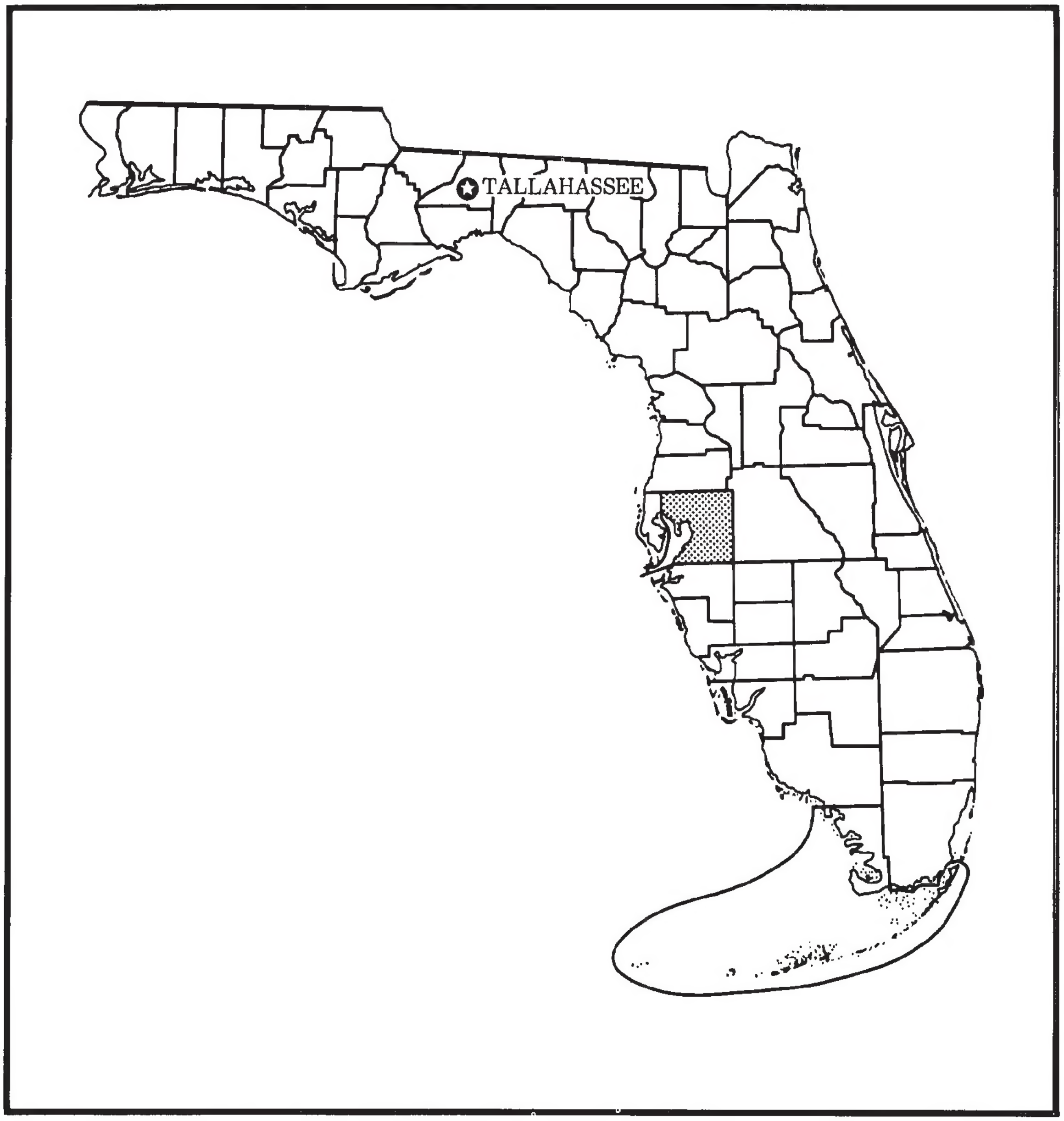
This soil survey contains information that can be used in land-planning programs in Hillsborough County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

James W. Mitchell
State Conservationist
Soil Conservation Service



Location of Hillsborough County in Florida.

Soil Survey of Hillsborough County, Florida

By James A. Doolittle, Gregg Schellentrager, and Susan Ploetz,
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Soils recorrelated by James A. Doolittle, Warren G. Henderson, Jr.,
Wade Hurt, Gregg Schellentrager, and Carol A. Wettstein,
Soil Conservation Service

Soils surveyed by Jean Beem, R. E. Caldwell, Victor W. Carlisle,
J. B. Cromartie, Orlando E. Cruz, Ralph G. Leighty (in charge of
initial survey), and James H. Walker, Florida Agricultural
Experiment Stations; and Joseph L. Huber, E. D. Matthews, Z. T. Millsap,
and William B. Warmack, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with
University of Florida, Institute of Food and Agricultural Sciences,
Agricultural Experiment Stations and Soil Science Department,
and Florida Department of Agriculture and Consumer Services

HILLSBOROUGH COUNTY occupies about 1,053 square miles, or 673,830 acres, in the west-central part of Florida. It is bounded on the south by Manatee County, on the east by Polk County, on the north by Pasco County, and on the west by Pinellas County and Tampa Bay. Except for the irregular coastline on the west, the county is nearly square. Tampa, the county seat, is in the west-central part of Hillsborough County.

General Nature of the County

In this section, environmental and cultural factors that affect the use and management of the soil in Hillsborough County are described. The factors are climate, history and development, transportation, recreation, and physiography, relief, and drainage.

Climate

Table 1 gives data on temperature and precipitation for the county as recorded at the local weather stations and Tampa International Airport in the period 1890 through 1983. The climate of Hillsborough County is subtropical. The temperatures are modified by winds that sweep across the peninsula from the Gulf of Mexico. The mean annual temperature is 72.2 degrees Fahrenheit. The long summers are warm and humid, but thundershowers occur almost every afternoon and prevent temperatures from becoming extremely high. Daytime temperatures during June, July, August, and September average near 90 degrees Fahrenheit.

Winters are short and mild; many of the days are bright and sunny, and little rain falls. Cold spells, accompanied by cold winds, can be expected only a few time during the year, and they last for only a few days. January is the coldest month with an average

temperature of 60.8 degrees. The nighttime average temperature in January is 51.3 degrees, and the daytime average is 70.2 degrees. Freezes can occur once or twice in a season although many winters have no damaging freezes. The lowest recorded temperature in Tampa was 18 degrees (December 1962).

Normally, snowfall is negligible, but 0.2 inch was recorded on January 19, 1977.

The average annual precipitation is about 50.2 inches at Plant City and 49.48 inches at Tampa. Generally, the rainy season begins in June and continues into September. During this period, the rainfall comes mainly in the form of heavy thunderstorms that generally last for 1 or 2 hours. About 60 percent (29 inches) of the annual rainfall occurs during June through September. The remaining 20 inches of rainfall is spread fairly evenly over the other months. The average annual rainfall for the period 1951 through 1980 was 46.73 inches.

The wettest year on record was 1959, when 76.57 inches of rainfall was recorded. The driest year recorded was 1956 with 28.89 inches of rain. The heaviest rain in a 24 hour period, 12.11 inches, was recorded in July 1960 at Tampa International Airport.

Moderately high winds and accompanying thunderstorms occur at all seasons of the year. From August through November, occasional disturbances of varying intensity, some of hurricane force, move northward from the tropics across the county. The heavy rains that accompany these storms are generally more damaging than the wind.

Ground fog occurs frequently from November through February.

History and Development

William G. Saalman and John F. Creighton, soil conservationists, Soil Conservation Service, helped to prepare this section.

Native Americans Indians occupied the Tampa Bay region for thousands of years. At the time of the early European explorations, the Caloosa and Timucua Indians were the major tribal groups. These tribes were decimated by European diseases. Later, the Seminole Indians became the major tribal group in this area.

The Spanish were early explorers of the area. Expeditions in 1513 by Ponce de Leon, in 1528 by Panfilo de Narvaez, and in 1539 by Hernando de Soto produced the earliest recorded reports of Tampa Bay. Early expeditions searched for gold, silver, and slaves. Settlements were not established.

The Spanish were met with hostility from the natives. The natives were already familiar with Europeans from previous unrecorded slave trade Spanish expeditions.

The city of Tampa was once a village of native American Indians. The diet of early inhabitants included a large amount of shellfish. Shell mounds, built over thousands of years from the discarded shells, were located around these villages.

English settlers arrived in 1823 and established a plantation near the Tampa shell mound at the mouth of the Hillsborough River. Shortly after, the U.S. Army confiscated the land and established a post called Fort Brooke. Shell mounds of the areas were dismantled and used for construction material for roadbeds and building foundations.

Hillsborough County was officially chartered in 1834. Initially, Hillsborough County was much larger than its present area and included what now makes up Pasco, Polk, Manatee, Sarasota, DeSoto, Charlotte, Highlands, Hardee, and Pinellas Counties. The city of Tampa was incorporated in 1849.

Settlers increased after the Seminole War ended in 1842. Transportation to the area was difficult. After the railroads were built in the 1880's, commerce and industry developed in Tampa. Agriculture expanded and spread to rural sections. By 1885, the population of Tampa had grown to 3,000 and to 10,000 in the entire county. The cigar industry began in Tampa at this time and prospered.

Shipment of vegetables to northern markets began about 1900. Since then, the production and shipment of winter vegetables, strawberries, and citrus fruit, and more recently, the production of nursery plants, tropical fish, and cut flowers has increased. These agricultural products are a major contributor to the economy of Hillsborough County.

The discovery of phosphate in Florida improved railroad service, and port development made Tampa one of the leading exporters of phosphate in the country.

The growth of Tampa was also tied to outside events, such as the Spanish-American War, Florida real estate booms, the Depression, and World War II. Because of wartime industrial growth, Tampa's industry increased from a prewar cigar and phosphate economic base to a wide diversity of postwar industries. Growth occurred as new residents came into the area and as urban areas along the city's borders were annexed. The population of the county also grew, but by 1960, about 82 percent of the county's population still resided in urban areas. In 1960, the population of Tampa was 275,000, and the population of Hillsborough County was 397,788.

During the last two decades, commerce and industry have continued to grow while the population of Tampa has remained relatively stable. The rest of the county has been increasing in population over the past two decades and is expected to continue its growth into the 21st century. In 1983, the population of Tampa was 276,576, and the population of Hillsborough County was 696,997.

Transportation

William G. Saalman and John F. Creighton, soil conservationists, Soil Conservation Service, helped to prepare this section.

Hillsborough County has an excellent air, land, and sea transportation network. The county is serviced by Tampa International Airport. This airport transports many passengers and ships large volumes of air freight, such as cut flowers, strawberries, and tropical fish. Smaller airports servicing the county are Peter O. Knight Airport, Tampa; Plant City Municipal Airport, Plant City; Vandenberg Airport, East Tampa; Hillsborough Airport, Dover; and Brandon Airport, Brandon. MacDill Air Force Base is at the southern tip of Tampa.

By land, the county is serviced by many local, State, Federal, and interstate highways. Interstate Highways 4, 75, and 275 converge in Tampa. The State road system diverges in all directions from Tampa.

By sea, commercial water transportation is available through the Port of Tampa, which is the seventh largest port in the Nation and includes one of the largest phosphate-loading complexes in the world. A large dry dock and cattle shipping facilities are in the Port of Tampa. Commercial access to Tampa Bay is also available at other points along the 83 miles of coastline.

Recreation

William G. Saalman and John F. Creighton, soil conservationists, Soil Conservation Service, helped to prepare this section.

The pleasant subtropical climate of Hillsborough County encourages many forms of outdoor recreation. Recreational resources are extensive and include fishing, swimming, boating, sailing, and all of the warm-season activities of freshwater and saltwater. The park system in Hillsborough County is extensive and includes 7 regional parks, 100 neighborhood parks, 6 urban parks, 12 district parks, 61 special parks, and numerous local parks.

Tourism brings many new people to the Tampa Bay area each year. Many tourists stay and become permanent residents.

Hillsborough County serves as the home of the Tampa Bay Buccaneers football team. Spring training headquarters for the Cincinnati Reds baseball team is based here. The University of Tampa and the University of South Florida provide intercollegiate sports competition.

Busch Gardens, a major theme park, is located in Tampa. Other major theme parks, such as Disney World, Sea World, Circus World, Weeki Wachee, Cypress Gardens, and others, are within 1 hour driving distance of Hillsborough County. The Florida State Fairground is also located in Hillsborough County.

Physiography, Relief, and Drainage

Kenneth M. Campbell, geologist, Florida Geological Survey, helped to prepare this section.

Hillsborough County is in the Floridian section of the Atlantic Coastal Plain *(7)*. The notable physiographic features of the area are related to ancient seas, which once covered the region. Relict shorelines are evidenced by subtle linear escarpments, which have not been significantly altered by fluvial (river) processes in much of the area. Four ancient shorelines are preserved in Hillsborough County. The Pamlico, Talbot, Penholoway, and Wicomico shorelines stand at or near 25, 42, 70, and 100 feet above present mean sea level, respectively.

C. Wythe Cooke *(4)* included the western and southern parts of the county in the Coastal Lowlands and the eastern part in the Central Highlands. The Coastal Lowlands are low, nearly level plains that lie next to the coast. The Central Highlands are the gently undulating to rolling areas in the eastern part of the county.

In the southwestern part of the county, Tampa Bay extends for a considerable distance inland. Its northern section is separated into Old Tampa Bay and Hillsborough Bay by a peninsula that extends southward from Tampa.

Large, nearly level plains, commonly called flatwoods, are in the western, southern, and northeastern parts of the county. These plains rise gradually from the coast to elevations of more than 100 feet in the eastern part of the county. Numerous intermittent ponds, swamps, and marshes and a few permanent lakes are in the flatwood areas. Many permanent lakes and intermittent ponds are in the northwestern and north-central parts of the county. Some of the larger lakes are Lake Thonotosassa, Lake Calrico, Mango Lake, Keystone Lake, and Lake Magdalene.

Along the coast, elevations in the county range from sea level to about 144 feet at a point about 3.4 miles east of Plant City *(8)*. Tampa is at an elevation of about 19 feet.

The surface drainage is toward Old Tampa Bay, Hillsborough Bay, and Tampa Bay. The principal streams are the Hillsborough, Alafia, and Little Manatee Rivers and Rocky, Sweetwater, Sixmile, and Bullfrog Creeks. Many ditches and small bays extend inland from the coast for short distances.

Only a few streams flow through the gently undulating uplands in the north-central part of the county. Many depressions, some of which contain water that has drained or seeped from surrounding soils, occur in these areas.

Drainage is slow on the flatwoods. It is provided by the slight depressions occupied by swamps and sloughs and by the few large streams that pass through the areas. The depressions contain water during the wet season; during the dry season, most of the water evaporates. A

large part of northwestern Hillsborough County is riddled with sinkholes because of the absence or thinning of the underlying clayey residuum. Many of the sinkhole lakes are in direct hydrologic contact with underlying limestone formations. Consequently, water levels fluctuate in response to the potentiometric surface of the Floridan Aquifer.

Several canals and many ditches have been dug to remove excess surface water. Provisions for controlling the rate of runoff has been made in only a few of these canals and ditches. Dams or locks are desirable in the ditches or canals. They help to control the rate of runoff and thus help to regulate the water table in soils next to the drainage area.

Soil suitability for various uses is normally based on evaluations of properties within the soil alone. Interpretations in this soil survey are made to determine the effects these properties could have on use. Many geologic features that are not expressed within the soil can significantly affect the suitability of a site for a particular use. Individual sites should be evaluated by onsite examination and testing. In many cases, special planning, design, and construction techniques can be used to minimize geologic problems where they are identified and evaluated.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification *(16)* used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit.

Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called similar inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior different enough to affect use or require different management. These are dissimilar inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of dissimilar soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

Use of the Ground-Penetrating Radar

A ground-penetrating radar (GPR) system *(5, 6, 9, 11)* was used to document the type and variability of soils that occur in the detailed soil map units. The GPR system (table 2) was successfully used on all soils to detect the presence, determine the variability, and measure the depth to major soil horizons or other soil features. About 660 random transects were made with the GPR in Hillsborough County. Information from notes and ground-truth observations made in the field was used along with radar data from this study to classify the soils and to determine the composition of map units. The map units, as described in the section entitled "Detailed Soil Map Units," are based on this data and on data in the previous survey.

Confidence Limits of Soil Survey Information

Confidence limits are statistical expressions of the probability that the composition of a map unit or a property of the soil will vary within prescribed limits. Confidence limits can be assigned numerical values based on a random sample. In the absence of specific data to determine confidence limits, the natural variability of soils and the way soil surveys are made must be considered. The composition of map units and other information is derived largely from extrapolations made from a small sample. The map units contain dissimilar inclusions. Also, information about the soils does not extend below 6 feet of the surface. The information presented in the soil survey is not meant to be used as a substitute for onsite investigations. Soil survey information can be used to select alternative practices or general designs that may be needed to minimize the possibility of soil-related failures. It cannot be used to interpret specific points on the landscape.

Specific confidence limits for the composition of map units in Hillsborough County were determined by random transects made with the GPR across mapped areas. The data are presented in the description of each soil under "Detailed Soil Map Units" and summarized in table 2. Soil scientists made enough transects and took enough samples to characterize each map unit at a specific confidence level. For example, map unit 29 was characterized at a 95 percent confidence level based on the transect data. The resulting composition would read: In 95 percent of the areas mapped as Myakka fine sand, Myakka soil and similar soils will comprise 84 to 93 percent of the delineation. In the other 7 to 16 percent of the areas of this map unit, the percentage of Myakka soil and similar soils may be higher than 93 percent or lower than 84 percent.

The composition of miscellaneous areas and urban map units was based on the judgment of the soil scientist and was not determined by a statistical procedure.

Table 2 presents the average composition of the map units and expresses the probability that the average composition will fall within the given range. The map unit is named for the taxon of the dominant soil or soils. The

proportion of similar and dissimilar soils is also given. Each soil listed by name in the table is described in the section "Soil Series and Their Morphology."

The percent composition of the map units is given in table 2. Those taxonomic units (soil series) identified on the transects of the selected map units are divided into two categories: named soils and similar soils and dissimilar soils. The soils listed in the named soils and similar soils column are in the same soil management group. The soils listed in the dissimilar soils column are different in use and management from those in named and similar soils of the map unit. Each soil listed in the table is described in the section "Soil Series and Their Morphology."

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Some of the boundaries on the general soil map of Hillsborough County do not match those on the general soil maps of adjacent counties, and some of the soil names and descriptions do not fully agree. The differences are the result of improvements in the classification of soils, particularly modification or refinements in soil series concepts. Also, there may be differences in the intensity of mapping or in the extent of the soils within the survey area.

Soils of the Uplands and Low Ridges

This group consists of nearly level to strongly sloping, excessively drained, moderately well drained, and somewhat poorly drained soils. These soils are on the uplands and on ridges and are sandy throughout. These soils are common in the north-central part of Hillsborough County and along the Alafia River. Four general soil map units are in this group.

1. Candler-Lake

Nearly level to strongly sloping, excessively drained soils that are sandy throughout

The soils in this map unit are in broad upland areas and on ridges. Throughout most of the map unit are a few scattered sinkholes and depressions. Candler soils are strongly sloping on hillsides and ridges on the uplands. Lake soils are nearly level on slightly lower ridges.

The existing natural vegetation consists of turkey oak, bluejack oak, post oak, live oak, and scattered longleaf pine and slash pine. The understory vegetation includes pineland threeawn, bluestem, paspalum, creeping lopsided indiangrass, chalky bluestem, panicum, purple lovegrass, and broomsedge bluestem.

This map unit makes up about 9 percent of Hillsborough County. It is about 55 percent Candler soils, 28 percent Lake soils, and 17 percent soils of minor extent.

Typically, Candler soils have a surface layer that is dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of 72 inches, is fine sand. It is light yellowish brown in the upper part and very pale brown in the lower part. The subsoil to a depth of 80 inches is a mixture of very pale brown fine sand and strong brown lamellae.

Typically, Lake soils have a surface layer that is dark grayish brown fine sand 4 inches thick. The underlying material extends to a depth of about 80 inches. It is strong brown fine sand in the upper part, reddish yellow fine sand in the middle part, and strong brown fine sand in the lower part.

The soils of minor extent in this map unit are Kendrick, Millhopper, and Tavares soils.

The soils in this map unit are used mainly for citrus crops. In some areas, they are used for pasture or for homesite or urban development. Some areas are left idle.

2. Urban land-Candler

Nearly level to strongly sloping, excessively drained soils that are sandy throughout and have thin lamellae below 66 inches of the surface; most areas have been modified for urban use

The soils in this map unit are in broad upland areas, on ridges, and in the urban areas. Throughout the map unit are a few scattered sinkholes and depressions. Lakes and ponds are common in some areas. These soils are on relict beach ridges that are overlain by eolian sands in and around the cities of Tampa and Brandon.

The existing natural vegetation consists of bluejack oak, live oak, and turkey oak. The understory vegetation consists of chalky bluestem, indiangrass, hairy panicum, panicum, and pineland threeawn.

This map unit makes up about 5 percent of Hillsborough County. It is about 33 percent Urban land, 25 percent Candler soils, and 42 percent soils of minor extent.

The Urban land part of this map unit is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Typically, Candler soils have a surface layer of dark brown fine sand about 6 inches thick. The subsurface layer extends to a depth of 72 inches. It is light yellowish brown fine sand in the upper part and very pale brown fine sand in the lower part. The subsoil to a depth of about 80 inches is a mixture of very pale brown fine sand and strong brown lamellae.

The soils of minor extent in this map unit are Millhopper, Kendrick, and Tavares soils.

Most of the acreage in this map unit is used for houses, large buildings, shopping centers, golf courses, and related urban uses. Farming is of no importance because of the extensive urban development. Numerous nurseries produce plants for landscaping. Natural vegetation thrives only in small areas scattered throughout the map unit.

3. Urban land-Tavares

Nearly level to sloping, moderately well drained soils that are sandy throughout; most areas have been modified for urban use

The soils in this map unit are in urban areas, on broad, low-lying ridges, and on the uplands. Throughout this map unit are a few scattered sinkholes and numerous lakes, ponds, and depressions. These soils are on low, relict beach ridges that are overlain by eolian sands in and around the city of Tampa.

The existing natural vegetation consists of bluejack oak, turkey oak, live oak, and longleaf pine. The understory vegetation includes creeping bluestem, lopsided indiangrass, grassleaf goldaster, panicum, and pineland threeawn.

This map unit makes up about 4 percent of Hillsborough County. It is about 43 percent Urban land, 34 percent Tavares soils, and 23 percent soils of minor extent.

The Urban land part of this map unit is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Typically, Tavares soils have a surface layer of very dark gray fine sand about 6 inches thick. The underlying material extends to a depth of about 80 inches. It is light yellowish brown fine sand in the upper part, very pale brown fine sand in the middle part, and white mottled fine sand in the lower part.

The soils of minor extent in this map unit are Millhopper, Zolfo, Candler, Seffner, Myakka, and Smyrna soils.

Most of the acreage in this map unit is used for houses, large buildings, shopping centers, golf courses, and related urban uses. Farming is of little importance because of the extensive urban development. Numerous nurseries produce plants for landscaping. Natural vegetation thrives only in a few areas in this map unit.

4. Zolfo-Seffner-Tavares

Nearly level to moderately sloping, moderately well drained and somewhat poorly drained soils that have a sandy subsoil or are sandy throughout

The soils in this map unit are in broad, low-lying areas on the uplands and on low ridges on the flatwoods. Throughout this map unit are a few scattered sinkholes and numerous lakes, ponds, and depressions. These soils are on relict beach ridges on the Coastal Lowlands and in the Western Valley and on low-lying plains that are adjacent to the Alafia River. Zolfo and Seffner soils are nearly level and are somewhat poorly drained. Zolfo soils are on low ridges on the flatwoods. Seffner soils are on broad, low ridges and on rims of depressions. Tavares soils are moderately well drained. They are in low-lying areas on hillslopes and ridges.

The existing natural vegetation consists of bluejack oak, turkey oak, live oak, and longleaf pine. The understory vegetation includes pineland threeawn, creeping bluestem, lopsided indiangrass, panicum, broomsedge, and scattered saw palmetto.

This map unit makes up about 8 percent of Hillsborough County. It is about 60 percent Zolfo soils, 20 percent Seffner soils, 10 percent Tavares soils, and 10 percent soils of minor extent.

Typically, Zolfo soils have a surface layer of very dark gray fine sand about 3 inches thick. The subsurface layer extends to a depth of about 60 inches. It is grayish brown mottled fine sand in the upper part, light gray mottled fine sand in the middle part, and grayish brown fine sand in the lower part. The subsoil to a depth of 80 inches is dark brown fine sand.

Typically, Seffner soils have a surface layer about 21 inches thick. It is very dark gray fine sand in the upper part and dark gray fine sand in the lower part. The underlying material extends to a depth of about 80 inches. It is very pale brown mottled fine sand in the upper part, light gray mottled fine sand in the middle part, and white mottled fine sand in the lower part.

Typically, Tavares soils have a surface layer of dark grayish brown fine sand about 6 inches thick. The underlying material extends to a depth of about 80 inches. It is pale brown fine sand in the upper part, very pale brown fine sand in the middle part, and light gray fine sand in the lower part.

The soils of minor extent in this map unit are Basinger, Candler, Myakka, Smyrna, Orlando, and Pomello soils.

In most areas, the soils in this map unit are used for citrus crops, as pasture, or for homesite and urban

development. In some areas, these soils are used for cultivated crops or are left idle.

Soils of the Flatwoods

This group consists of nearly level to gently sloping, moderately well drained, poorly drained, and very poorly drained soils. The soils are on broad, low ridges. Characteristically, the vegetation in these areas is an open forest of pine trees and a ground cover of saw palmetto and pineland threeawn. These soils are scattered throughout Hillsborough County but are most extensive in the southern part. Four general soil map units are in this group.

5. Myakka-Basinger-Holopaw

Nearly level, poorly drained and very poorly drained soils that have a sandy subsoil, are sandy throughout, or have a loamy subsoil

The soils in this map unit are on broad, low-lying plains on the flatwoods that are interspersed with many broad sloughs, depressions, and drainageways. These soils are extensive on the Coastal Lowlands. Myakka soils are poorly drained and are on broad plains on the flatwoods. Basinger and Holopaw soils are very poorly drained. Basinger soils are in depressions and sloughs. Holopaw soils are in the interior areas of depressions, sloughs, and swamps.

In areas of Myakka soils, the natural vegetation consists of longleaf pine and slash pine and an understory vegetation of saw palmetto, pineland threeawn, gallberry, and running oak. In areas of Basinger and Holopaw soils, the natural vegetation consists of mixed stands of cypress, sweetgum, red maple, and black tupelo and an understory of maidencane, cutgrass, and Jamaica sawgrass.

This map unit makes up 35 percent of Hillsborough County. It is 39 percent Myakka soils, 7 percent Basinger soils, 5 percent Holopaw soils, and 49 percent soils of minor extent.

Typically, Myakka soils have a surface layer of very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 20 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 25 inches, is black fine sand. The middle part, to a depth of 30 inches, is dark reddish brown fine sand. The lower part, to a depth of about 38 inches, is brownish yellow fine sand. The upper part of the substratum, to a depth of about 55 inches, is very pale brown fine sand. The lower part to a depth of about 80 inches is dark grayish brown fine sand.

Typically, Basinger soils have a surface layer of black fine sand about 7 inches thick. The subsurface layer, to a depth of about 28 inches, is gray fine sand. The subsoil, to a depth of about 42 inches, is brown and grayish brown fine sand. The substratum to a depth of about 80 inches is light brownish gray fine sand.

Typically, Holopaw soils have a surface layer of black mucky fine sand about 6 inches thick. The upper part of the subsurface layer, to a depth of about 12 inches, is dark gray fine sand. The middle part, to a depth of about 42 inches, is light gray fine sand. The lower part, to a depth of about 52 inches, is grayish brown fine sand. The upper part of the subsoil, to a depth of about 64 inches, is gray mottled sandy loam. The lower part to a depth of about 80 inches is light gray sandy loam.

The soils of minor extent in this map unit are Immokalee, Wabasso, Smyrna, and Felda soils.

Most of the acreage in this map unit is used for citrus crops, as pasture, as habitat for wildlife, or for homesite and urban development. In some areas, these soils are used for cultivated crops or are left idle.

6. Myakka-Immokalee-Pomello

Nearly level to gently sloping, poorly drained and moderately well drained soils that have a sandy subsoil

The soils in this map unit are on broad plains that are interspersed with low ridges. Scattered shallow depressions and poorly-defined drainageways are in some areas. These soils are extensive on the Polk Upland in the southeastern part of the county. Myakka and Immokalee soils are nearly level and are poorly drained. These soils are on broad, low-lying plains on the flatwoods. Pomello soils are nearly level to gently sloping and are moderately well drained. These soils are on low ridges on the flatwoods.

In areas of Myakka and Immokalee soils, the natural vegetation consists of longleaf pine and slash pine that have an understory of saw palmetto, pineland threeawn, gallberry, and running oak. In areas of Pomello soils, the natural vegetation is mainly longleaf pine, sand pine, and slash pine that have an understory of saw palmetto, creeping bluestem, pineland threeawn, and running oak.

This map unit makes up 15 percent of Hillsborough County. It is about 35 percent Myakka soils, 14 percent Immokalee soils, 12 percent Pomello soils, and 39 percent soils of minor extent.

Typically, Myakka soils have a surface layer of very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 20 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 25 inches, is black fine sand. The middle part, to a depth of about 30 inches, is dark reddish brown fine sand. The lower part, to a depth of about 38 inches, is brownish yellow fine sand. The upper part of the substratum, to a depth of about 55 inches, is very pale brown fine sand. The lower part to a depth of about 80 inches is dark grayish brown fine sand.

Typically, Immokalee soils have a surface layer of very dark gray fine sand about 8 inches thick. The subsurface layer, to a depth of about 36 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 46 inches, is black fine sand. The middle part, to a depth

of about 52 inches, is dark reddish brown fine sand. The lower part to a depth of about 80 inches is dark brown fine sand.

Typically, Pomello soils have a surface layer of very dark gray fine sand about 3 inches thick. The subsurface layer, to a depth of about 43 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 46 inches, is dark brown fine sand. The lower part, to a depth of about 55 inches, is brown fine sand. The substratum to a depth of about 80 inches is grayish brown fine sand.

The soils of minor extent are Archbold, Basinger, Malabar, Ona, St. Johns, Samsula, Tavares, and Wabasso soils.

In most areas, the soils in this map unit are used for native pasture. A few areas are used for cultivated crops, improved pasture, or citrus crops or for homesite or urban development.

7. Urban land-Myakka-Smyrna

Nearly level, poorly drained soils that have a sandy subsoil; most areas have been modified for urban use

The soils in this map unit are in urban areas and on broad, low-lying plains on the flatwoods. In some areas are scattered shallow depressions, poorly-defined drainageways, and low ridges. The soils are mainly on the Coastal Lowlands in and around the city of Tampa.

The existing natural vegetation consists of longleaf pine and slash pine. The understory vegetation includes saw palmetto, pineland threeawn, gallberry, and running oak.

This map unit makes up about 9 percent of Hillsborough County. It is about 23 percent Urban land, 14 percent Myakka soils, 14 percent Smyrna soils, and 49 percent soils of minor extent.

The Urban land part of this map unit is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Typically, Myakka soils have a surface layer of very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 20 inches, is light gray fine sand. The subsoil extends to a depth of about 44 inches. It is very dark grayish brown fine sand in the upper part, dark brown fine sand in the middle part, and yellowish brown fine sand in the lower part.

Typically, Smyrna soils have a surface layer of very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 12 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 15 inches, is dark brown fine sand. The lower part, to a depth of about 20 inches, is very dark grayish brown fine sand. The substratum extends to a depth of about 80 inches. It is light brownish gray mottled fine sand in the upper part and is brown fine sand in the lower part.

The soils of minor extent in this map unit are Archbold, Basinger, Malabar, Ona, Tavares, St. Johns, and Wabasso soils.

The soils in much of this map unit are used for houses, large buildings, shopping centers, and related urban uses. Most of the natural vegetation has been removed. Farming is of little importance because of the extensive urban development.

8. Malabar-Wabasso-Basinger

Nearly level, poorly drained and very poorly drained soils that have a loamy subsoil, or have a sandy and loamy subsoil, or are sandy throughout

The soils in this map unit are on broad plains on the flatwoods that are interspersed with low-lying flats and shallow depressions. Streams, drainageways, and sloughs are common in some areas. These soils are extensive along the Coastal Lowland, which is south of the Alafia River, and on the low flatwoods, which are adjacent to the Hillsborough River, in the northern part of the county. Malabar and Wabasso soils are poorly drained. Malabar soils are on broad, low-lying plains and sloughs on the flatwoods. Wabasso soils are on broad plains on the flatwoods. Basinger soils are very poorly drained and are along the exterior areas of swamps and depressions.

The existing natural vegetation consists of slash pine and cabbage palm. The understory vegetation includes saw palmetto, pineland threeawn, and waxmyrtle.

This map unit makes up about 3 percent of Hillsborough County. It is about 60 percent Malabar soils, 15 percent Wabasso soils, 5 percent Basinger soils, and 20 percent soils of minor extent.

Typically, Malabar soils have a surface layer of black fine sand about 5 inches thick. The subsurface layer extends to a depth of about 25 inches. It is gray fine sand in the upper part and white fine sand in the lower part. The upper part of the subsoil, to a depth of about 56 inches, is brownish yellow and brown fine sand. The next layer, to a depth of 68 inches, is light gray fine sand. The lower part of the subsoil to a depth of about 80 inches is gray sandy loam.

Typically, Wabasso soils have a surface layer of very dark gray fine sand about 7 inches thick. The subsurface layer, to a depth of about 29 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 38 inches, is black and dark brown fine sand. The lower part of the subsoil, to a depth of about 60 inches, is light gray and mottled light greenish gray sandy clay loam. The substratum to a depth of about 80 inches is gray loamy sand.

Typically, Basinger soils have a surface layer of black fine sand about 7 inches thick. The subsurface layer, to a depth of about 28 inches, is gray fine sand. The subsoil, to a depth of about 42 inches, is brown and

grayish brown fine sand. The substratum to a depth of 80 inches is light brownish gray fine sand.

The soils of minor extent in this map unit are Holopaw, Myakka, Pinellas, Smyrna, and St. Johns soils.

In most areas, the soils in this map unit are in natural vegetation. A few areas are used as pasture or for homesite and urban development.

Soils of the Wetlands and Coastal Areas

This group consists of nearly level, somewhat poorly drained, poorly drained, and very poorly drained soils. These soils are on flood plains, in poorly-defined drainageways, in swamps and marshes throughout Hillsborough County, and on slight knolls that border Tampa Bay. Three general soil map units are in this group.

9. Winder-Chobee-St. Johns

Nearly level, poorly drained and very poorly drained soils that have a loamy or a sandy subsoil

The soils in this map unit are on or are closely associated with the flood plains of the Hillsborough and Alafia Rivers and their major tributaries. Ponds are common in some areas. Winder and St. Johns soils are poorly drained and are in slightly higher positions on the flood plains than Chobee soils. Chobee soils are very poorly drained.

The existing natural vegetation consists of a dense growth of water oak, cypress, elm, ash, hickory, red maple, and sweetgum. The understory vegetation is a mixture of water-tolerant plants, such as maidencane, sawgrass, swamp primrose, buttonbush, smartweed, sedge, and other similar plants.

This map unit makes up about 4 percent of Hillsborough County. It is about 50 percent Winder soils, 25 percent Chobee soils, 10 percent St. Johns soils, and 15 percent soils of minor extent.

Typically, Winder soils have a surface layer of very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 10 inches, is grayish brown fine sand. The upper part of the subsoil, to a depth of about 14 inches, is dark grayish brown mottled sandy loam and gray fine sand. The lower part, to a depth of about 30 inches, is gray sandy clay loam. The upper part of the substratum, to a depth of about 58 inches, is light gray mottled sandy clay loam. The lower part to a depth of 80 inches is gray sandy loam.

Typically, Chobee soils have a surface layer that is 12 inches thick. It is black muck in the upper part and black loamy fine sand in the lower part. The subsoil extends to a depth of about 80 inches. It is very dark gray sandy clay loam in the upper part, gray sandy clay loam in the middle part, and light gray mottled sandy loam in the lower part.

Typically, St. Johns soils have a surface layer that is about 12 inches thick. It is black fine sand in the upper part and very dark grayish brown fine sand in the lower part. The subsurface layer, to a depth of about 29 inches, is light brownish gray fine sand. The upper part of the subsoil, to a depth of about 36 inches, is black fine sand. The middle part, to a depth of about 46 inches, is dark reddish brown fine sand. The lower part, to a depth of about 50 inches, is dark yellowish brown fine sand. The substratum to a depth of about 80 inches is light brownish gray fine sand.

The soils of minor extent in this map unit are Basinger, Holopaw, Felda, Myakka, and Wabasso soils.

Most areas of this map unit have been left idle in natural vegetation. A few areas are used for pasture.

10. Samsula-Basinger

Nearly level, very poorly drained soils that are mucky in the upper part and sandy in the lower part or are sandy throughout

The soils in this map unit are around the exterior areas of swamps and sloughs and in broad, poorly-defined drainageways on the flatwoods. Lakes and ponds are common in some areas. These soils are scattered throughout the county but are most extensive on the Osceola Plain.

The existing natural vegetation consists of mixed stands of cypress, red maple, sweetgum, and black tupelo. The understory vegetation includes cutgrass, maidencane, and Jamaica sawgrass.

This map unit makes up about 2 percent of Hillsborough County. It is about 65 percent Samsula soils, 10 percent Basinger soils, and 25 percent soils of minor extent.

Typically, Samsula soils have a surface layer that is about 41 inches thick. It is black muck in the upper part, dark reddish brown muck in the middle part, and black fine sand in the lower part. The underlying material to a depth of about 80 inches is light brownish gray fine sand.

Typically, Basinger soils have a surface layer of black fine sand about 7 inches thick. The subsurface layer, to a depth of about 28 inches, is gray fine sand. The subsoil, to a depth of 42 inches, is brown and grayish brown fine sand. The substratum to a depth of about 80 inches is light brownish gray fine sand.

The soils of minor extent in this map unit are Felda, Holopaw, Immokalee, Ona, St. Johns, and Smyrna soils.

Most areas of this map unit have been left idle in natural vegetation. Some areas of these soils have been drained and are used for improved pasture. Other areas have been filled and are used for homesite or urban development.

11. Myakka-Urban land-St. Augustine

Nearly level, very poorly drained to somewhat poorly drained soils that have a sandy subsoil or are sandy throughout; many areas have been modified for urban use

Figure 1.—Phosphate mining is important to the economy of Hillsborough County.

The soils in this map unit are in broad, low flatwood areas, tidal marshes, urban areas, and on slight knolls adjacent to Tampa Bay. If water control measures are not used, the soils in this map unit are subject to tidal flooding. Myakka soils are poorly drained and very poorly drained and are in tidal marshes or on the flatwoods adjacent to Tampa Bay. St. Augustine soils are somewhat poorly drained and are on flats and knolls that resulted from dredging and filling operations.

The existing vegetation consists mainly of salt-tolerant grasses and shrubs, such as needlegrass rush, seashore saltgrass, marshhay cordgrass, big cordgrass, smooth cordgrass, and red mangrove. A few scattered longleaf pines, slash pines, and saw palmetto are in the more elevated areas.

This map unit makes up about 2 percent of Hillsborough County. It is about 36 percent Myakka soils, 20 percent Urban land, 20 percent St. Augustine soils, and 24 percent soils of minor extent.

Typically, Myakka soils have a surface layer of very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 22 inches, is grayish brown fine sand. The subsoil, to a depth of about 40 inches, is very dark grayish brown fine sand. The substratum to a depth of about 80 inches is brown fine sand that contains many shell fragments.

The Urban land part of this map unit is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Typically, St. Augustine soils have a surface layer of dark gray fine sand about 3 inches thick. The underlying material extends to a depth of about 80 inches. It is light brownish gray fine sand in the upper part, light gray mottled fine sand that contains balls of sandy clay in the middle part, and gray fine sand in the lower part.

The soils of minor extent in this map unit are Broward, Kesson, Malabar, and Wabasso soils.

The soils in much of this map unit are used for houses, large buildings, shopping centers, marinas, and related urban uses and recreational uses. Most of the natural vegetation has been removed. Farming is of little importance because of the extensive urban development.

Soils of the Manmade Areas

These areas are dominated by features associated with phosphate mining, such as removing overburden, excavating pebble phosphate, and processing phosphate fertilizers and phosphoric acids. Some areas are actively mined, and some areas are left idle.

12. Arents-Haplaquents-Quartzipsamments

Very steep, heterogenous soils; nearly level, very poorly drained soils that are clayey throughout; and moderately well drained to excessively drained soils that are sandy throughout

These areas are in the phosphate belt (see fig. 1) in eastern Hillsborough County. Local relief, slope, and drainage vary more in this association than in the other associations.

Most idle areas have been revegetated and now provide improved pasture for livestock.

This map unit makes up about 4 percent of Hillsborough County. It is about 55 percent Arents, 20 percent Haplaquents, 9 percent Quartzipsamments, and 16 percent soils of minor extent.

The soils of minor extent include Slickens, Gypsum land, and some undisturbed areas of Gainesville, Zolfo, and Fort Meade soils.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. Table 2 gives the average composition of selected map units as determined by Ground-Penetrating Radar (GPR) and other transect methods. The map units in this section are based on this data and on data in the previous survey. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Eaton fine sand is one of several phases in the Eaton series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tavares-Millhopper fine sands, 0 to 5 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Basinger, Holopaw and Samsula soils, depressional, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Gypsum land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Some of the boundaries on the soil maps of Hillsborough County do not match those on the soil maps of adjacent counties, and some of the soil names and descriptions do not fully agree. The differences are the result of improvements in the classification of soils, particularly modification or refinements in soil series concepts. Also, there may be differences in the intensity of mapping or in the extent of the soils within the survey area.

2—Adamsville fine sand. This soil is nearly level and somewhat poorly drained. It is on broad ridges on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Adamsville fine sand, the Adamsville soil and similar soils make up 82 to 99 percent of these mapped areas. Dissimilar soils make up 1 to 18 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 6 inches thick. The upper part of the underlying material, to a depth of about 30 inches, is brown fine sand. The lower part to a depth of about 80

inches is pale brown, mottled fine sand. Similar soils included in mapping are very dark grayish brown or dark grayish brown fine sand in the lower part of the underlying material. Other similar soils, in some of the higher parts of the landscape, are moderately well drained.

Dissimilar soils included in mapping are Lochloosa and Pomello soils in small areas.

In most years, a seasonal high water table is at a depth of 20 to 40 inches for 2 to 6 months and recedes to a depth of 60 inches during prolonged dry periods. Permeability is rapid. The available water capacity is low.

In most areas, this soil is used for improved pasture, citrus crops, or homesite or urban development. In a few areas, this soil is used for cultivated crops, or it is left in natural vegetation, which consists of bluejack oak, turkey oak, longleaf pine, and slash pine. The understory includes broomsedge bluestem, lopsided indiangrass, saw palmetto, and pineland threeawn.

In areas that are relatively free of freezing temperatures, this soil is well suited to citrus crops if an adequate water control system is established and maintained and soil-improving measures are applied. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Droughtiness, a result of the low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system will help maintain optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve soil quality.

This soil is moderately well suited to pasture. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderately high. This soil has few limitations for woodland use and management.

If this soil is used for building site development, the main management concerns are excessive wetness, instability of cutbanks, and possible contamination of ground water. Drainage is needed to lower the high water table, and fill material is needed in some areas. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields need to be mounded in most areas. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Adamsville soil is in capability subclass IIIw, in woodland group 10W, and in the Oak Hammocks range site.

3—Archbold fine sand. This soil is nearly level and moderately well drained. It is on low ridges on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of areas mapped as Archbold fine sand, the Archbold soil and similar soils make up 82 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 18 percent of the mapped areas.

Typically, this soil has a surface layer of light gray fine sand about 2 inches thick. The underlying material to a depth of about 80 inches is white fine sand. In places, similar soils included in mapping have a black or very dark brown subsoil in the lower part of the horizon. Other similar soils, in some of the higher parts of the landscape, are well drained.

Dissimilar soils included in mapping are some unnamed, excessively drained soils in small areas. Also included are some small areas of unnamed, moderately well drained soils that have a black or very dark brown subsoil within 30 inches of the surface.

In most years, a seasonal high water table is at a depth of 42 to 60 inches for about 6 months, and it recedes to a depth of 60 to 80 inches during prolonged dry periods. Permeability is very rapid. The available water capacity is very low.

In most areas, this soil has been left idle in "scrub" forest. A few areas are used for pasture or for homesite or urban development. The natural vegetation consists of sand pines. The understory includes pineland threeawn, pricklypear cactus, and saw palmetto.

This soil generally is not suited to most cultivated crops and citrus crops. Droughtiness and rapid leaching of plant nutrients limit the kinds of crops that can be grown and reduce potential yield of all crops. Droughtiness, a result of the very low available water capacity, is a management concern, especially during extended dry periods.

This soil is poorly suited to pasture. The very low available water capacity limits the production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of sand pines is moderate. The main management concerns for producing and harvesting timber are seedling mortality and equipment use limitations. The very low available water capacity adversely affects seedling survival in areas where understory plants are numerous. The fine sand texture of the surface layer limits the use of equipment.

Population growth has resulted in increased construction of houses on this soil. If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of ground water. Cutbanks are not stable and are subject to slumping. If the density of housing is

moderate to high, a community sewage system can help to prevent contamination of water supplies by seepage.

This Archbold soil is in capability subclass VIs, in woodland group 3S, and in the Sand Pine-Scrub Oak range site.

4—Arents, nearly level. Arents consist of nearly level, heterogeneous soil material. This material has been excavated, reworked, and reshaped by earthmoving equipment. Arents are near urban centers, phosphate-mining operations, major highways, and sanitary landfills.

Arents do not have an orderly sequence of soil layers. This map unit is not associated with or confined to a particular kind of soil. Arents are variable and contain discontinuous lenses, pockets, or streaks of black, gray, grayish brown, brown, or yellowish brown sandy or loamy fill material. The thickness of the fill material ranges from 30 to 80 inches or more.

Included in this map unit are areas used as sanitary landfills. Refuse consists of concrete, glass, metal, plastic, wood, and other materials and ranges in thickness from 2 to 10 feet. It is generally stratified with layers of soil material that were used as daily cover. These areas are identified on soil maps by the words "sanitary landfill." Also included are small areas of soil that has slope that ranges from 0 to 5 percent.

Most soil properties are variable. The depth to the seasonal high water table varies with the amount of fill material and artificial drainage. Permeability and the available water capacity vary widely from one area to another.

In most areas, the soil in this map unit has been left idle or is used for homesites, recreation, and urban development. In a few areas, the soil is used for pasture (fig. 2). An individual assessment of each site is necessary to determine its potential for different uses.

The soils in this map unit have not been assigned to a capability subclass, a woodland group, or range site.

5—Basinger, Holopaw and Samsula soils, depressional. The soils in this map unit are nearly level and very poorly drained. They are in swamps and depressions on the flatwoods. Generally, Basinger soil is along the exterior of swamps or in shallow depressions. Holopaw and Samsula soils are in the interior areas of the swamps or in deeper depressions. Undrained areas are frequently ponded for very long periods. The slope is 0 to 2 percent.

In 90 percent of the areas of this map unit, Basinger, Holopaw and Samsula soils, depressional, and similar soils make up 78 to 96 percent of the mapped areas, and dissimilar soils make up about 4 to 22 percent of the mapped areas. Generally, the mapped areas consist of about 35 percent Basinger soil and similar soils, 31 percent Holopaw soil and similar soils, and 18 percent Samsula soil and similar soils. The individual soils are generally in large enough areas to be mapped separately, but in considering their present and predicted use, they were mapped as one unit.

Typically, the surface layer of Basinger soil is black fine sand about 7 inches thick. The subsurface layer, to a depth of about 28 inches, is gray fine sand. The subsoil, to a depth of about 42 inches, is brown and grayish brown fine sand. The substratum to a depth of about 80 inches is light brownish gray fine sand. Similar soils included in mapping, in some areas, have a surface layer of mucky fine sand, and it is more than 7 inches thick.

Typically, the surface layer of Holopaw soil is black mucky fine sand about 6 inches thick. The upper part of the subsurface layer, to a depth of about 12 inches, is dark gray fine sand. The middle part, to a depth of about 42 inches, is light gray fine sand. The lower part, to a depth of about 52 inches, is grayish brown fine sand. The upper part of the subsoil, to a depth of about 64 inches, is grayish brown fine sand. The lower part to a depth of about 80 inches is gray, mottled sandy loam. Similar soils included in mapping, in some areas, have a black surface layer more than 10 inches thick.

Typically, the upper part of the surface tiers of Samsula soil is black muck about 10 inches thick. The lower part, to a depth of about 34 inches, is dark reddish brown muck. The layer below the organic material, to a depth of about 40 inches, is black fine sand. The underlying material to a depth of 80 inches is light brownish gray fine sand. Similar soils included in mapping, in some areas, have organic material that is more than 51 inches thick.

Dissimilar soils included in mapping are the Ona and other sandy soils, all in small areas. These soils have a well-developed sandy subsoil at a depth of more than 40 inches.

In most years, the undrained areas in this map unit are ponded for about 6 months. Permeability is rapid in Basinger and Samsula soils. It is rapid in the surface and subsurface layer of Holopaw soil and moderately slow or moderate in the subsoil. The available water capacity is low in Basinger soil, low or moderate in Holopaw soil, and high in Samsula soil.

In most areas, the soils making up this map unit have been left in natural vegetation. In some drained areas, the soils are used as pasture. In other areas that have been filled, the soils are used for homesite or urban development. The natural vegetation consists of cypress. The understory includes bluestem, maidencane, panicum, Jamaica sawgrass, and cutgrass.

The soils are generally not suited to most cultivated crops, citrus crops, or pasture because of ponding, excessive wetness, and low natural fertility. A drainage system is needed in most areas to remove excess surface water and reduce soil wetness, but suitable outlets are generally not available.

These soils are generally not suited to the production of pines because of ponding or extended wetness. They

Figure 2.—This reclaimed phosphate-mined area is in a traditional land and water pattern on Arents soil. This area is used for recreation and pasture.

may be suited to the production of cypress and hardwoods through natural regeneration.

If these soils are used for building site development or for onsite waste disposal, ponding is the main limitation. Drainage is needed to lower the water table, and fill material is needed in most areas. While surface drainage helps to control ponding, the seasonal high water table is a continuing limitation.

The soils in this map unit are in capability subclass VIIw. Basinger and Holopaw soils are in woodland group 2W. Samsula soil has not been assigned to a woodland group. The soils in this map unit are in the Freshwater Marshes and Ponds range site.

6—Broward-Urban land complex. This complex consists of Broward soil that is nearly level and somewhat poorly drained and of areas of Urban land. This complex is in the low-lying coastal areas. The slope is 0 to 2 percent.

This map unit consists of 45 to 60 percent Broward soil and 40 to 45 percent Urban land. The included soils make up 10 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Broward soil is very dark gray fine sand about 4 inches thick. The upper part of

the underlying material, to a depth of 10 inches, is gray fine sand. The middle part, to a depth of 14 inches, is grayish brown fine sand. The lower part, to a depth of 26 inches, is very pale brown fine sand. This layer is underlain by gray and white limestone. In places, the limestone is thin and discontinuous.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Malabar and Wabasso soils in small areas. These soils are in lower positions on the landscape than Broward soils, and they are poorly drained.

In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal high water table at a depth of about 20 to 30 inches for 2 to 6 months in most years. The permeability of Broward soil is rapid. The available water capacity is low or very low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Broward soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are depth to bedrock, wetness, possible contamination of the ground water, and instability of cutbanks. The moderately deep bedrock often interferes with the installation of septic tank absorption fields and sewer systems. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping. Plans for homesite development should provide for the preservation of as many trees as possible. Droughtiness, a result of low or very low available water capacity, is a limitation, especially during extended dry periods. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

7—Candler fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and excessively drained. It is on the uplands.

In 95 percent of the areas mapped as Candler fine sand, 0 to 5 percent slopes, the Candler soil and similar soils make up 82 to 96 percent of the mapped areas. Dissimilar soils make up 4 to 18 percent of the mapped areas.

Typically, this soil has a surface layer of dark gray fine sand about 6 inches thick. The upper part of the subsurface layer, to a depth of about 35 inches, is light yellowish brown fine sand. The middle part, to a depth of about 72 inches, is very pale brown fine sand. The lower part to a depth of about 80 inches is a mixture of very pale brown fine sand and strong brown loamy sand lamellae that are about one-sixteenth to one-quarter of an inch thick and 2 to 6 inches long. In some places, similar soils included in the mapped areas do not have lamellae in the lower part of the subsurface layer. Other similar soils, in some areas, have a subsurface layer that consists of 5 to 10 percent silt and clay; and some similar soils also included in mapping, in some of the lower parts of the landscape, are well drained.

Dissimilar soils included in mapping are Kendrick and Millhopper soils in small areas. Kendrick soils are well drained, and Millhopper soils are moderately well drained. Also included are areas of unnamed soils on upper side slopes that are well drained and have a sandy clay loam subsoil within 40 to 80 inches of the surface.

A seasonal high water table is at a depth of more than 80 inches. Permeability is rapid. The available water capacity is very low.

In most areas, this Chandler soil is used for citrus crops. In a few areas, it is used for pasture or for homesite or urban development. The natural vegetation consists of bluejack oak, Chapman oak, scrub live oak, and turkey oak. The understory includes indiangrass, hairy panicum, panicum, and running oak.

This soil is suited to citrus crops in areas that are relatively free of freezing temperatures. If this soil is used for cultivated crops, the main limitations are droughtiness and rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yield of crops. Droughtiness, a result of the very low available water capacity, is a management concern, especially during extended dry periods. Irrigation is generally feasible where irrigation water is readily available. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to conserve moisture, maintain fertility, and control erosion.

This soil is moderately suited to pasture. The very low available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if the soil is properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of sand pines is moderate. The main management concerns for producing and harvesting timber are seedling mortality and the equipment use limitations. The very low available water capacity adversely affects seedling survival in areas where understory plants are numerous. The fine

sand texture of the surface layer limits the use of equipment.

If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Candler soil is in capability subclass IVs, in woodland group 8S, and in the Longleaf Pine-Turkey Oak Hills range site.

8—Candler fine sand, 5 to 12 percent slopes. This soil is sloping to strongly sloping and excessively drained. It is on the uplands.

In 80 percent of the areas mapped as Candler fine sand, 5 to 12 percent slopes, the Candler soil and similar soils make up about 82 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 18 percent of the mapped areas.

Typically, this soil has a surface layer of dark gray fine sand about 6 inches thick. The subsurface layer extends to a depth of about 74 inches. In the upper part, it is yellow fine sand. In the lower part, it is very pale brown fine sand. The next layer to a depth of about 80 inches is very pale brown fine sand that has yellowish brown loamy sand lamellae that are about one-sixteenth of an inch thick and 2 to 4 inches long. Similar soils included in mapping do not have lamellae. Other similar soils, in some areas, have 5 to 10 percent silt and clay in the subsurface layer, and similar soils, in some of the lower parts of the landscape, are well drained.

Dissimilar soils included in mapping are Millhopper and Kendrick soils in small areas. Millhopper soils are moderately well drained, and Kendrick soils are well drained. Also included are some unnamed soils on the upper side slopes. These soils have a subsoil at a depth of more than 40 inches. They are well drained.

A seasonal high water table is at a depth of more than 80 inches. Permeability is rapid. The available water capacity is very low.

In most areas, this Candler soil has been left in natural vegetation. In some areas, it is used for citrus crops or pasture or for homesite or urban development. The natural vegetation consists of bluejack oak, Chapman oak, scrub live oak, and turkey oak. The understory includes indiangrass, hairy panicum, and pineland threeawn.

This soil is generally not suited to most cultivated crops because of droughtiness, rapid leaching of plant nutrients, and steepness of slope. This soil is suited to citrus crops in areas that are relatively free of freezing temperatures. Droughtiness, a result of the very low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and to obtain maximum yields. A ground cover of close-growing plants between tree rows reduces erosion.

This soil is moderately suited to pasture. The very low available water capacity of the soil limits the production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of sand pines is moderate. The main management concerns for producing and harvesting timber are seedling mortality and the equipment use limitations. The very low available water capacity adversely affects seedling survival in areas where understory plants are numerous. The fine sand texture of the surface layer limits the use of equipment.

Population growth has resulted in increased construction of houses on this soil. If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of ground water. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Candler soil is in capability subclass VIs, in woodland group 8S, and in the Longleaf Pine-Turkey Oak Hills range site.

9—Candler-Urban land complex, 0 to 5 percent slopes. This complex consists of Candler soil that is nearly level to gently sloping and excessively drained and of areas of Urban land. This complex is on the uplands.

This map unit consists of 45 to 60 percent Candler soil and 35 to 45 percent Urban land. The included soils make up 18 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Candler soil is dark gray fine sand about 6 inches thick. The upper part of the subsurface layer, to a depth of 26 inches, is brownish yellow fine sand. The lower part, to a depth of 76 inches, is very pale brown fine sand. The subsoil to a depth of about 80 inches is very pale brown fine sand that has yellowish brown loamy sand lamellae that are about one-sixteenth to one-quarter of an inch thick and 2 to 6 inches long. In places, the soil does not have lamellae. In some areas, the subsurface layer contains 5 to 10 percent silt and clay. In some of the lower parts of the landscape, the soil is well drained.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces

that obscure or alter the soils so that their identification is not feasible.

Included in mapping are small areas of Kendrick, Millhopper, and Tavares soils. Kendrick and Millhopper soils are on convex shoulders and upper side slopes. Kendrick soils are well drained, and Millhopper soils are moderately well drained. Tavares soils are in lower-lying, concave areas on the landscape. These soils are moderately well drained.

A seasonal high water table is at a depth of more than 80 inches. The permeability of Candler soil is rapid. The available water capacity is low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Candler soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help to prevent contamination of water supplies by seepage. Plans for homesite development should provide for the preservation of as many trees as possible. Droughtiness, a result of the very low available water capacity, is a hazard, especially during extended dry periods. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

10—Chobee loamy fine sand. This soil is nearly level and very poorly drained. It is on low-lying flats on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Chobee loamy fine sand, the Chobee soil and similar soils make up 88 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 12 percent of the mapped areas.

Typically, this soil has a surface layer of black loamy fine sand about 16 inches thick. The upper part of the subsoil, to a depth of about 33 inches, is dark gray sandy loam. The lower part, to a depth of 49 inches, is grayish brown, mottled sandy clay loam. The substratum to a depth of about 80 inches is light gray, mottled loamy fine sand. Similar soils included in mapping have a surface layer of fine sand. Other similar soils, in some places, have a subsoil at a depth of more than 20 inches.

Dissimilar soils included in mapping are Winder soils in small areas. These soils are poorly drained.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for more than 6 months. Permeability is moderately rapid in the surface layer, slow or very slow in the subsoil, and moderately slow to moderately rapid in the substratum. The available water capacity is high.

In most areas, this Chobee soil is used for pasture or cultivated crops. In a few areas, it is used for homesite or urban development or is left in natural vegetation. The natural vegetation consists of cypress, cabbage palm, slash pine, and Coastal Plain willows. The understory includes buttonbush, maidencane, and Jamaica sawgrass.

If a water control system is established and maintained and soil-improving measures applied, this soil is suited to most cultivated crops. If suitable outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer are generally needed to maintain fertility.

If a water control system is established and maintained, this soil is well suited to pasture. Excess surface water can be removed from most areas if field drains are installed. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

The potential of this soil for the production of slash pines is high in areas that have adequate drainage. The main management concerns for producing and harvesting timber are the equipment use limitations and seedling mortality. If the soil is not properly drained, equipment use is limited. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize excessive wetness limitations.

If this soil is used for building site development or for onsite waste disposal, the main management concerns are excessive wetness and the slow or very slow permeability of the subsoil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Slow to very slow permeability and the high water table increase the possibility that the septic tank absorption fields will not function properly. The slow or very slow permeability limitation can be minimized by increasing the size of the absorption field. Septic tank absorption fields need to be mounded in most areas.

This Chobee soil is in capability subclass IIIw and in woodland group 11W. It has not been assigned to a range site.

11—Chobee muck, depressional. This soil is nearly level and very poorly drained. It is in broad depressions. This soil is mainly in Harney Flats. Large ditches and canals that are equipped with water-control structures dissect this map unit in most places. Undrained areas

are ponded for very long periods. The slope is less than 1 percent.

In 80 percent of the areas mapped as Chobee muck, depressional, the Chobee soil and similar soils make up 80 to 99 percent of the mapped areas. Dissimilar soils make up 20 percent or less of the map unit.

Typically, this soil has a surface layer that is about 12 inches thick. It is black muck in the upper 9 inches. In the lower 3 inches, it is black loamy fine sand. The upper part of the subsoil, to a depth of about 36 inches, is very dark gray sandy clay loam. The lower part, to a depth of about 48 inches, is gray sandy clay loam. The substratum to a depth of about 80 inches is light gray, mottled sandy loam.

Dissimilar soils included in mapping are small areas of an unnamed very poorly drained soil. This soil has an organic surface layer more than 16 inches thick.

The undrained areas in this map unit are ponded for 3 to 6 months. The drained areas in this map unit have a seasonal high water table that fluctuates from the soil surface to a depth of about 10 inches except during extended dry periods. Permeability is rapid in the upper part of the surface layer and moderately rapid in the lower part. It is slow or very slow in the subsoil and moderately rapid in the substratum. The available water capacity is high.

In most areas, this Chobee soil is used for pasture or urban development. In a few areas, it is used for homesites or is left in natural vegetation. The natural vegetation consists of cypress, sweetgum, and Coastal Plain willow. The understory includes buttonbush, maidencane, and Jamaica sawgrass.

In its natural state, this soil is generally not suited to cultivated crops. If a water control system, such as dikes, ditches, and pumps, is established and maintained, this soil is suited to most cultivated crops. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer are generally needed to maintain fertility.

If a water control system is established and maintained, this soil is well suited to pasture. Excess surface water can be removed from most areas if field drains are installed. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is generally not suited to the production of pines because of ponding or extended wetness. It may be suited to the production of cypress and hardwoods through natural regeneration.

If this soil is used for building site development or for onsite waste disposal, ponding is the main hazard. While surface drainage helps to control ponding, the seasonal high water table is a continuing limitation.

This Chobee soil is in capability subclass VIIw, in woodland group 2W, and in the Freshwater Marshes and Ponds range site.

12—Chobee sandy loam, frequently flooded. This soil is nearly level and very poorly drained. It is on bottom lands mainly along the Hillsborough River and Blackwater Creek. This soil is flooded for very long periods following prolonged intense rain. The slope is dominantly less than 1 percent.

In 90 percent of the areas mapped as Chobee sandy loam, frequently flooded, the Chobee soil and similar soils make up 78 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 22 percent of the mapped areas.

Typically, this soil has a surface layer of black sandy loam about 15 inches thick. The subsoil extends to a depth of about 60 inches. The upper part is very dark gray, mottled sandy clay loam. The lower part is gray, mottled sandy clay loam. The substratum to a depth of about 80 inches is light gray, mottled loamy sand. In some areas, similar soils included in mapping have a surface layer of mucky fine sand, fine sand, or loamy fine sand. Other similar soils have a thinner surface layer than Chobee soil, and in places, some similar soils have thin, discontinuous strata of limestone in the underlying material.

Dissimilar soils included in mapping are Felda and Wabasso soils in small areas. These soils are poorly drained.

A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches. Permeability is moderately rapid in the surface layer, slow or very slow in the subsoil, and very slow to moderately rapid in the substratum. The available water capacity is high.

In most areas, this Chobee soil has been left in natural vegetation. In a few areas, it is used for pasture. The natural vegetation consists of baldcypress, Coastal Plain willow, red maple, cabbage palm, and sweetgum. The understory includes buttonbush, maidencane, sawgrass, smartweed, and sedges.

In its natural state, this soil is generally not suited to cultivated crops. If a water control system, such as dikes, ditches, and pumps, is established and maintained, this soil is suited to cultivated crops, citrus crops, and pasture.

This soil is generally not suited to the production of pine trees because of flooding or extended wetness. It may be suited to the production of cypress and hardwoods through natural regeneration.

If this soil is used for building site development or for onsite waste disposal, flooding is the main hazard. Major flood control structures and extensive local drainage systems are needed to control flooding.

This Chobee soil is in capability subclass Vw, in woodland group 6W, and in the Freshwater Marshes and Ponds range site.

13—Eaton fine sand. This soil is nearly level and poorly drained. It is in sloughs on the flatwoods. It is mainly in the northeastern part of the county. The slope is 0 to 2 percent.

In 90 percent of the areas mapped as Eaton fine sand, the Eaton soil and similar soils make up 80 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 20 percent of the mapped areas.

Typically, this soil has a surface layer of black fine sand about 5 inches thick. The subsurface layer, to a depth of about 22 inches, is light brownish gray fine sand. The upper part of the subsoil, to a depth of about 28 inches, is dark grayish brown, mottled sandy clay. The lower part to a depth of about 80 inches is light brownish gray, mottled sandy clay. Similar soils included in mapping, in some areas, have a surface layer that is more than 8 inches thick.

Dissimilar soils included in mapping are Wabasso soils in small areas. Wabasso soils have a sandy subsoil above a loamy subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 1 to 4 months. Permeability is rapid in the surface and subsurface layers and slow in the subsoil. The available water capacity is moderate.

In most areas, this Eaton soil is used for pasture. In a few areas, it is used for homesite or urban development. The natural vegetation consists of longleaf pine, slash pine, sweetgum, and water oak. The understory includes gallberry, hairy panicum, and pineland threeawn.

If a water control system is established and maintained and soil-improving measures applied, this soil is suited to most cultivated crops. If suitable outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve soil quality.

This soil is suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is high. The main management concerns for producing and harvesting timber are the equipment use limitations. Equipment use limitations are a concern unless the soil is properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitations.

If this soil is used for building site development, the main management concerns are excessive wetness, slow permeability of the subsoil, and possible contamination of the ground water. Drainage is needed to lower the high water table, and fill material is needed in most areas. The slow permeability and the high water table increase the possibility that the septic tank absorption fields will not function properly. The slow permeability limitation can be minimized by increasing the size of the absorption field. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Eaton soil is in capability subclass IIIw and in woodland group 11W. It has not been assigned to a range site.

14—Eaton mucky sand, depressional. This soil is nearly level and very poorly drained. It is in depressions on the flatwoods. Undrained areas are ponded for very long periods. The slope is 0 to 2 percent.

In 80 percent of the areas mapped as Eaton fine sand, depressional, the Eaton soil and similar soils make up 78 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 22 percent of the mapped areas.

Typically, this soil has a surface layer of black mucky sand about 8 inches thick. The subsurface layer, to a depth of 22 inches, is light gray, mottled fine sand. The subsoil extends to a depth of about 48 inches. The upper part is dark grayish brown, mottled sandy clay. The lower part is dark gray, mottled sandy clay. The substratum to a depth of about 80 inches is gray, mottled sandy clay. Similar soils included in mapping, in some areas, have a surface layer that is more than 8 inches thick, or it is mucky fine sand, or it is both. Other similar soils have a subsoil that is within 20 inches of the surface.

Dissimilar soils included in mapping are Felda, Samsula, and Wabasso soils in small areas. These soils are poorly drained.

In most years, the undrained areas in this map unit are ponded for 1 to 4 months. A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 9 months. Permeability is rapid in the surface and subsurface layers and slow in the subsoil. The available water capacity is moderate.

In most areas, this Eaton soil has been left in natural vegetation. In some areas, the soil has been drained, and it is used for pasture. The natural vegetation consists of cypress and sweetgum. The understory includes sand cordgrass, bluestem, maidencane, and waxmyrtle.

In its natural state, this soil is generally not suited to cultivated crops. If a water control system, such as dikes, ditches, and pumps, is established and maintained, this soil is suited to most cultivated crops and pasture.

This soil is generally not suited to the production of pine trees because of ponding or extended wetness. It may be suited to the production of cypress and hardwoods through natural regeneration.

This Eaton soil is in capability subclass VIIw and in woodland group 2W. It has not been assigned to a range site.

15—Felda fine sand. This soil is nearly level and poorly drained. It is on broad sloughs on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Felda fine sand, the Felda soil and similar soils make up 90 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 10 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 5 inches thick. The upper part of the subsurface layer, to a depth of about 18 inches, is dark gray, mottled fine sand. The lower part, to a depth of about 22 inches, is dark grayish brown, mottled fine sand. The subsoil, to a depth of about 45 inches, is light brownish gray, mottled sandy clay loam. The substratum to a depth of about 80 inches is light gray loamy sand that contains many shell fragments. Similar soils included in mapping have a subsoil at a depth of more than 40 inches. Other similar soils, in places, have a subsoil within 20 inches of the surface.

Dissimilar soils included in mapping are Pinellas and Wabasso soils in small areas. Pinellas soils are calcareous in the upper part of the subsoil. Wabasso soils have a sandy subsoil above a loamy subsoil.

A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 2 to 6 months in most years. Permeability is rapid in the surface and subsurface layers and is moderate in the subsoil. The available water capacity is moderate.

In most areas, this Felda soil is used for pasture. In a few areas, it is used for cultivated crops or for homesite or urban development, or it has been left idle in natural vegetation. The natural vegetation consists of cabbage palm and slash pine. The understory includes saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops. If suitable outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility.

This soil is suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is moderately high. The main management concern for producing and harvesting timber is seedling mortality. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitation.

If this soil is used for building site development, the main management concern is excessive wetness. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Septic tank absorption fields need to be mounded in most areas.

This Felda soil is in capability subclass IIIw, in woodland group 10W, and in the Slough range site.

16—Felda fine sand, occasionally flooded. This soil is nearly level and poorly drained. It is on low terraces of major rivers and streams. It is flooded for very long periods following prolonged intense rains. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Felda fine sand, occasionally flooded, the Felda soil and similar soils make up 79 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 21 percent of the mapped areas.

Typically, this soil has a surface layer of dark gray fine sand about 6 inches thick. The upper part of the subsurface layer, to a depth of about 12 inches, is grayish brown fine sand. The lower part, to a depth of about 22 inches, is light gray, mottled fine sand. The subsoil, to a depth of about 38 inches, is gray, mottled sandy clay loam. The substratum to a depth of about 80 inches is light brownish gray, mottled loamy sand. Similar soils included in mapping have a subsoil within 20 inches of the surface. Other similar soils have a subsoil at a depth of more than 40 inches.

Dissimilar soils included in mapping are Basinger and Wabasso soils in small areas. Basinger soils are very poorly drained. Wabasso soils have a sandy subsoil above a loamy subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 2 to 6 months. Permeability is rapid in the surface and subsurface layers and is moderate to moderately rapid in the subsoil. The available water capacity is moderate.

In most areas, this Felda soil has been left idle in natural vegetation. In a few areas, it is used for pasture. The natural vegetation consists of swamp maple, cabbage palm, slash pine, and sweetgum. The understory includes saw palmetto, pineland threeawn, and waxmyrtle.

This soil is suited to cultivated crops if a water control system, such as dikes, ditches, and pumps, is established and maintained. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility.

This soil is suited to pasture. Wetness and flooding limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness.

Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is moderately high. The equipment use limitations are a management concern unless the soil is properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitation.

If this soil is used for building site development or for onsite waste disposal, flooding is the main hazard. Major flood control structures and extensive local drainage systems are needed to control flooding.

This Felda soil is in capability subclass IVw, in woodland group 10W, and in the Freshwater Marshes and Ponds range site.

17—Floridana fine sand. This soil is nearly level and very poorly drained. It is in sloughs and swales on the flatwoods. The slope is 0 to 2 percent.

In 60 percent of the areas mapped as Floridana fine sand, the Floridana soil and similar soils make up 80 to 98 percent of the mapped areas. Dissimilar soils make up 2 to 20 percent of the mapped areas.

Typically, this soil has a surface layer of black fine sand about 12 inches thick. The subsurface layer, to a depth of about 28 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 43 inches, is dark gray, mottled sandy clay loam. The middle part, to a depth of about 60 inches, is gray, mottled sandy clay loam. The lower part to a depth of about 80 inches is gray, mottled sandy loam. Similar soils included in mapping, in some areas, have a surface layer that is less than 10 inches thick. Other similar soils have a subsoil within 20 inches of the surface; and in some places, the included similar soils have a subsoil at a depth of more than 40 inches.

Dissimilar soils included in mapping are Samsula and Wabasso soils in small areas. Samsula soils are organic, and Wabasso soils are poorly drained.

A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches. Permeability is rapid in the surface and subsurface layers and slow or very slow in the subsoil. The available water capacity is high.

In most areas, this Floridana soil is used for cultivated crops or pasture. In a few areas, it is used for homesite or urban development. The natural vegetation consists of cabbage palm and slash pine. The understory includes bluestem, maidencane, panicum, and pineland threeawn.

If a water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops. If suitable outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility.

This soil is suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is moderately high. The main management concerns for producing and harvesting timber are equipment use limitations and seedling mortality. Equipment use limitations are a concern if the soil is not properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitation.

If this soil is used for building site development, the main management concerns are excessive wetness and the slow to very slow permeability of the subsoil. Drainage is needed to lower the high water table, and fill material is needed in most areas. The slow or very slow permeability and the high water table increase the possibility that the septic tank absorption fields will not function properly. The slow or very slow permeability can be minimized by increasing the size of the absorption field.

This Floridana soil is in capability subclass IIIw and in woodland group 11W. It has not been assigned to a range site.

18—Fort Meade loamy fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and well drained. It is on the uplands.

In 90 percent of the areas mapped as Fort Meade loamy fine sand, 0 to 5 percent slopes, the Fort Meade soil and similar soils make up 86 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 14 percent of the mapped areas.

Typically, this soil has a surface layer that is about 26 inches thick. The upper 7 inches is very dark gray loamy fine sand. The lower 19 inches is very dark grayish brown loamy sand. The upper part of the underlying material, to a depth of about 58 inches, is yellowish brown loamy sand. The lower part to a depth of about 80 inches is light yellowish brown loamy sand. Similar soils included in mapping are weakly indurated in the lower part of the underlying material. Other similar soils have a surface layer that is less than 10 inches thick.

Dissimilar soils included in mapping are Millhopper soils in small areas. These soils are moderately well drained.

A seasonal high water table is at a depth of more than 72 inches. Permeability is rapid. The available water capacity is low or moderate.

In most areas, this Fort Meade soil is used for citrus crops, cultivated crops, or pasture. In a few areas, it is used for homesite or urban development. The natural

vegetation consists of bluejack oak, live oak, turkey oak, and slash pine. The understory includes lopsided indiangrass, panicum, and pineland threeawn.

This soil is well suited to citrus crops in areas that are relatively free of freezing temperatures. If this soil is used for cultivated crops, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yield of crops. Droughtiness, a result of the low to moderate available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system helps to maintain optimum soil moisture and thus ensures maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to conserve moisture, maintain fertility, and control erosion.

This soil is well suited to pasture. The low or moderate available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if the soil is properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is moderately high. This soil has few limitations for woodland use and management. The low to moderate available water capacity generally influences seedling survival in areas where understory plants are numerous. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants.

If this soil is used for building site development, the main management concerns are the instability of cutbanks and the possible contamination of the ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Fort Meade soil is in capability subclass IIIs, in woodland group 10S, and in the Upland Hardwood Hammocks range site.

19—Gainesville loamy fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and well drained. It is on the uplands.

In 95 percent of the areas mapped as Gainesville loamy fine sand, 0 to 5 percent slopes, the Gainesville soil and similar soils make up 89 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 11 percent of the mapped areas.

Typically, this soil has a surface layer of very dark grayish brown loamy fine sand about 9 inches thick. The underlying material extends to a depth of about 80 inches. The upper 29 inches is brown loamy fine sand. The lower 42 inches is strong brown loamy fine sand.

Similar soils included in mapping, in some areas, have a surface layer that is more than 10 inches thick. Other similar soils, in some of the lower parts of the landscape, are moderately well drained.

Dissimilar soils included in mapping are Millhopper soils in small areas. These soils are moderately well drained.

A seasonal high water table is at a depth of more than 72 inches. Permeability is rapid. The available water capacity is low.

In most areas, this Gainesville soil is used for citrus crops, cultivated crops, or pasture. In a few areas, it is used for homesite or urban development. The natural vegetation consists of bluejack oak, live oak, turkey oak, and slash pine. The understory includes lopsided indiangrass, panicum, and pineland threeawn.

This soil is well suited to citrus crops in areas that are relatively free of freezing temperatures. If this soil is used for cultivated crops, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yields of crops. Droughtiness, a result of the low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system helps to maintain optimum soil moisture and thus ensures maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to conserve moisture, maintain fertility, and control erosion.

This soil is well suited to pasture. The low available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is moderately high. The soil has few limitations for woodland use and management. The low available water capacity generally influences seedling survival in areas where understory plants are numerous. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants.

If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Gainesville soil is in capability subclass IIIs, in woodland group 10S, and in the Upland Hardwood Hammocks range site.

20—Gypsum land. This miscellaneous area consists of moderately steep to very steep mounds of gypsum. Gypsum is a product of acid manufacturing plants that are associated with phosphate-mining operations. The material is in mounds that are 30 to 60 feet high.

This miscellaneous area is not suited to cultivated crops, pasture, or commercial trees. The surface generally is very unstable, and it erodes easily. These areas do not support vegetation; acidity and compaction inhibits the growth of plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

21—Immokalee fine sand. This soil is nearly level and poorly drained. It is on broad plains on the flatwoods. The slope is 0 to 2 percent.

In 80 percent of the areas mapped as Immokalee fine sand, the Immokalee soil and similar soils make up 77 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 23 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 8 inches thick. The subsurface layer, to a depth of 36 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 46 inches, is black fine sand. The middle part, to a depth of about 52 inches, is dark reddish brown fine sand. The lower part to a depth of about 80 inches is dark brown fine sand. Similar soils included in mapping have a subsoil that is at a depth of more 50 inches. Other similar soils, in some areas, have a subsoil within 30 inches of the surface. Also, some included similar soils, in places, have a subsoil that is brown or dark brown.

Dissimilar soils included in mapping are Ona and Wabasso soils in small areas. Ona soils do not have a subsurface layer. Wabasso soils have a sandy subsoil above a loamy subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for more than 2 months and recedes to a depth of 10 to 40 inches for 8 months or more. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low.

In most areas, this Immokalee soil is used for native pasture. In a few areas, it is used for cultivated crops, improved pasture, or citrus crops or for homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes creeping bluestem, chalky bluestem, lopsided indiangrass, saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is suited to most cultivated crops, citrus crops, and pasture. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve crop production.

If a water control system is established and maintained, this soil is well suited to pasture (fig. 3). Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderate. Equipment use limitations and seedling mortality are the main limitations. Equipment use limitations are a management concern unless the soil is properly drained. Planting and harvesting operations should be scheduled during dry periods. Water-tolerant trees should be planted. Bedding of rows helps to minimize the excessive wetness limitations.

If this soil is used for building site development, the main management concerns are excessive wetness and instability of cutbanks. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Septic tank absorption fields need to be mounded in most areas. Cutbanks are not stable and are subject to slumping.

This Immokalee soil is in capability subclass IVw, in woodland group 8W, and in the South Florida Flatwoods range site.

22—Immokalee-Urban land complex. This complex consists of Immokalee soil that is nearly level and poorly drained and of areas of Urban land. This complex is on the flatwoods. The slope is 0 to 2 percent.

This map unit consists of 45 to 60 percent Immokalee soil and 35 to 45 percent Urban land. The included soils make up 14 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Immokalee soil is black fine sand about 5 inches thick. The upper part of the subsurface layer, to a depth of 13 inches, is grayish brown fine sand. The lower part, to a depth of 35 inches, is light gray fine sand. The upper part of the subsoil, to a depth of 40 inches, is black fine sand. The middle part, to a depth of 47 inches, is dark reddish brown fine sand. The lower part, to a depth of 60 inches, is dark brown fine sand. The substratum to a depth of about 80 inches is light brownish gray fine sand. In places, the upper part of the subsoil is at a depth of more than 50 inches. In some areas, the upper part of the subsoil is within 30 inches of the soil surface.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces

Figure 3.—This bahiagrass on Immokalee fine sand provides good grazing for the dairy herd.

that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Ona and Wabasso soils in small areas. Ona soils do not have a subsurface layer. They are in slightly lower-lying swales and on flats. Wabasso soils have a sandy subsoil above a loamy subsoil. Wabasso soils are in similar positions on the flatwoods as Immokalee soil.

In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal high water table that fluctuates from a depth of about 10 inches to the soil surface for 2 months. The seasonal high water table recedes to a depth of 10 to 40 inches for 8 months or more. The permeability of Immokalee soil is rapid in the surface and subsurface layers, moderate or moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Immokalee soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are excessive wetness and the instability of cutbanks. Most areas of this map unit are artificially drained. Drainage is needed to lower the water table, and fill material is needed in undrained areas for building site development. Cutbanks are not stable and are subject to slumping. Plans for homesite development should provide for the preservation of as many trees as possible. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

23—Kendrick fine sand, 2 to 5 percent slopes. This soil is gently sloping and well drained. It is on the uplands.

In 95 percent of the areas mapped as Kendrick fine sand, 2 to 5 percent slopes, the Kendrick soil and similar soils make up 84 to 89 percent of the mapped areas. Dissimilar soils make up 11 to 16 percent of the mapped areas.

Typically, this soil has a surface layer of grayish brown fine sand about 4 inches thick. The subsurface layer, to a depth of 35 inches, is light yellowish brown fine sand. The upper part of the subsoil, to a depth of about 68 inches, is brownish yellow, mottled sandy loam. The lower part to a depth of about 80 inches is yellowish brown, mottled sandy clay loam. Similar soils included in mapping have a subsoil at a depth of more than 40 inches. Other similar soils, in some of the lower parts of the landscape, are moderately well drained.

Dissimilar soils included in mapping are Candler and Tavares soils in small areas. Candler soils are excessively drained. Tavares soils are moderately well drained.

A seasonal high water table is at a depth of more than 72 inches. Permeability is rapid in the surface and subsurface layers. It is moderate or moderately rapid in the upper part of the subsoil and slow to moderate in the lower part. The available water capacity is low.

In most areas, this Kendrick soil is used for citrus crops or pasture. In a few areas, it is used for homesite or urban development. The natural vegetation consists of bluejack oak, turkey oak, and slash pine. The understory includes dogfennel, lopsided indiangrass, and hairy panicum.

This soil is well suited to citrus crops in areas that are relatively free of freezing temperatures. If this soil is used for cultivated crops, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yield of crops. Droughtiness, a result of the low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system helps to maintain optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to conserve moisture, maintain fertility, and control erosion.

This soil is well suited to pasture. The low available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed.

The potential of this soil for the production of slash pines is high. This soil has few limitations for woodland use and management. Using special equipment, such as machinery equipped with rubber tires, and harvesting during the dry periods can reduce the equipment use limitations.

If this soil is used for building site development, the main management concern is instability of cutbanks. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping.

This Kendrick soil is in capability subclass IIs, in woodland group 11S, and in the Upland Hardwood Hammocks range site.

24—Kesson muck, frequently flooded. This soil is level and very poorly drained. It is in tidal swamps and marshes. Kesson soil is subject to shallow flooding by the highest of normal tides. It is also subject to occasional deep flooding by storm tides. The slope is dominantly less than 1 percent.

In 80 percent of the areas mapped as Kesson muck, frequently flooded, the Kesson soil and similar soils make up 81 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 19 percent of the mapped areas.

Typically, this soil has a surface layer of black muck about 5 inches thick. The underlying material extends to a depth of about 80 inches. The upper 33 inches is gray, mottled fine sand. The lower 42 inches is light olive gray, mottled fine sand. Similar soils included in mapping have a surface layer that is more than 8 inches thick. Other similar soils have thin discontinuous strata of limestone in the underlying material and, in some places, similar soils have thin sandy clay loam or sandy loam strata in the underlying material.

Dissimilar soils included in mapping are Myakka soils in small areas. Myakka soils have a sandy subsoil and do not have an organic surface layer.

A seasonal high water table fluctuates from the soil surface to a depth of about 6 inches. It is affected by tidal fluctuations. Permeability is rapid in the surface layer and moderately rapid or rapid in the underlying material. The available water capacity is low.

In most areas, this Kesson soil has been left idle. In a few areas, it is used for urban development. The natural vegetation consists of black mangrove and scattered American mangrove. The understory includes saltwort and seashore saltgrass.

This soil is generally not suited to most cultivated crops or pasture or to the production of pine trees because of the flooding hazard and saline conditions of the soil.

If this soil is used for building site development or for onsite waste disposal, tidal flooding is the main hazard. Drainage is needed to lower the water table, and fill material is needed in most areas.

This Kesson soil is in capability subclass VIIIw. It has not been assigned to a woodland group. This soil is in the Saltwater Marsh range site.

25—Lake fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and excessively drained. It is on the uplands.

In 95 percent of the areas mapped as Lake fine sand, 0 to 5 percent slopes, the Lake soil and similar soils make up 75 to 93 percent of the mapped areas. Dissimilar soils make up 7 to 25 percent of the mapped areas.

Typically, this soil has a surface layer of dark grayish brown fine sand about 4 inches thick. The underlying material extends to a depth of about 80 inches. The upper 24 inches is strong brown fine sand. The next 40 inches is reddish yellow fine sand. The lower 12 inches is strong brown fine sand. Similar soils included in mapping, in some places, are gray or light gray in the lower part of the underlying material. Other similar soils, in some areas, consist of less than 5 percent silt and clay in the underlying material. The included similar soils, in some of the lower parts of the landscape, are well drained.

Dissimilar soils included in mapping are Kendrick, Millhopper, and Tavares soils in small areas. Kendrick soils are well drained. Millhopper and Tavares soils are moderately well drained.

A seasonal high water table is at a depth of more than 80 inches. Permeability is rapid. The available water capacity is very low or low.

In most areas, this Lake soil is used for citrus crops. In a few areas, it is used for pasture or for homesite or urban development. The natural vegetation consists of bluejack oak, Chapman oak, scrub oak, live oak, and turkey oak. The understory includes lopsided indiangrass, running oak, and pineland threeawn.

This soil is suited to citrus crops in areas that are relatively free of freezing temperatures. If this soil is used for cultivated crops, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yield of crops. Droughtiness, a result of the very low to low available water capacity, is a management concern, especially during extended dry periods. Irrigation is generally feasible in most areas where irrigation water is readily available. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to conserve moisture, maintain fertility, and control erosion.

This soil is moderately suited to pasture. The very low or low available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is moderately high. The main management concerns for producing and harvesting timber are the equipment use limitations and seedling mortality. The fine sand texture of the surface layer limits the use of equipment. The very low to low available water capacity adversely affects seedling survival in areas where understory plants are numerous.

If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, community sewage systems will help to prevent contamination of water supplies by seepage.

This Lake soil is in capability subclass IVs, in woodland group 10S, and in the Longleaf Pine-Turkey Oak Hills range site.

26—Lochloosa-Micanopy fine sands, 0 to 5 percent slopes. The soils in this map unit are nearly level to gently sloping and somewhat poorly drained. These soils are on the uplands.

In 95 percent of the areas of this map unit, Lochloosa-Micanopy fine sands, 0 to 5 percent slopes, and similar soils make up 97 to 99 percent of the mapped areas, and dissimilar soils make up 1 to 3 percent of the mapped areas. Generally, the mapped areas consist of about 51 percent Lochloosa soil and similar soils and 48 percent Micanopy soil.

Typically, the surface layer of Lochloosa soil is dark gray fine sand 7 inches thick. The upper part of the subsurface layer, to a depth of about 15 inches, is very pale brown fine sand. The lower part, to a depth of about 28 inches, is pale brown fine sand. The upper part of the subsoil, to a depth of about 35 inches, is light yellowish brown fine sandy loam. The middle part, to a depth of about 40 inches, is yellowish brown, mottled sandy clay loam. The lower part, to a depth of about 69 inches, is gray, mottled sandy clay loam. The substratum to a depth of about 80 inches is gray sandy clay loam. Similar soils included in mapping, in some areas, have a subsoil at a depth of more than 40 inches.

Typically, the surface layer of Micanopy soil is very dark gray fine sand 5 inches thick. The subsurface layer, to a depth of about 15 inches, is brown fine sand. The upper part of the subsoil, to a depth of about 25 inches, is mottled yellowish brown sandy clay loam. The lower part to a depth of about 80 inches is gray, mottled sandy clay.

Dissimilar soils included in mapping are Adamsville soils in small areas. Adamsville soils do not have a subsoil.

Lochloosa soil has a seasonal high water table at a depth of 30 to 60 inches for 1 to 4 months, but it recedes to a depth of more than 60 inches during prolonged dry periods. Micanopy soil has a perched, seasonal high water table at a depth of 18 to 30 inches

for 1 to 3 months, but it recedes to a depth of more than 60 inches during prolonged dry periods. Permeability of Lochloosa soil is moderately rapid or rapid in the surface and subsurface layers and slow to moderately rapid in the subsoil. Permeability of Micanopy soil is rapid in the surface and subsurface layers. It is moderate in the upper part of the subsoil and slow in the lower part. The available water capacity is moderate in these soils.

In most areas, the soils in this map unit are used for citrus crops or for homesite or urban development. In a few areas, they are used for cultivated crops or improved pasture, or they are left in natural vegetation. The natural vegetation consists of live oak, turkey oak, longleaf pine, and slash pine. The understory includes chalky bluestem, lopsided indiangrass, panicum, pineland threeawn, and waxmyrtle.

If the soils in this map unit are used for cultivated crops, the main limitations are wetness and low natural fertility. These soils are moderately suited to citrus crops in areas that are relatively free of freezing temperatures. A well designed and properly managed irrigation system helps to maintain optimum soil moisture and thus ensure maximum yields. A drainage system is needed for most cultivated crops and pasture plants. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve crop production.

The soils in this map unit are well suited to pasture. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of these soils for the production of slash pines is high. These soils have few limitations for woodland use and management.

If this map unit is used for building site development or for onsite waste disposal, the main management concerns are wetness and the slow permeability of the subsoil. Population growth has resulted in increased construction of houses on these soils. A perched, seasonal high water table is above the subsoil in Micanopy soil. Drainage is needed to lower the high water table. The slow permeability limitation can be minimized by increasing the size of the absorption field. Septic tank absorption fields need to be mounded in some areas. In areas of Lochloosa soil, cutbanks are not stable and are subject to slumping.

The soils in this map unit are in capability subclass IIw, in woodland group 11A, and in the Upland Hardwood Hammocks range site.

27—Malabar fine sand. This soil is nearly level and poorly drained. It is in low-lying sloughs and shallow depressions on the flatwoods. The slope is 0 to 2 percent.

In 80 percent of the areas mapped as Malabar fine sand, the Malabar soil and similar soils make up 79 to 92 percent of the mapped areas. Dissimilar soils make up 8 to 21 percent of the mapped areas.

Typically, this soil has a surface layer of dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 12 inches, is light brownish gray fine sand. The upper part of the subsoil, to a depth of about 30 inches, is brownish yellow fine sand. The next layer, to a depth of about 50 inches, is pale brown fine sand. The lower part, to a depth of about 66 inches, is gray, mottled fine sandy loam. The substratum to a depth of about 80 inches is grayish brown fine sand. Similar soils included in mapping, in some areas, have a Btg horizon that is within 40 inches of the surface. Other similar soils, in some areas, do not have a Bw horizon; and in some areas are similar soils that have a subsoil that is brown or dark brown in the upper part.

Dissimilar soils included in mapping are Basinger and Wabasso soils in small areas. Basinger soils are very poorly drained. Wabasso soils have a dark color sandy subsoil below the subsurface layer. Also included are some unnamed soils that have a dark color sandy subsoil at a depth of more than 30 inches and do not have a loamy subsoil below the sandy subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 2 to 6 months. Permeability is rapid in the surface and subsurface layers, slow in the subsoil, and moderately rapid or rapid in the substratum. The available water capacity is very low or low. The depressions are subject to shallow flooding during heavy rains.

In most areas, this Malabar soil has been left idle in native vegetation. In some areas, the soil has been drained and is used for cultivated crops or pasture or for homesite or urban development. The natural vegetation consists of cabbage palm, longleaf pine, and slash pine. The understory includes broomsedge, bluestem, inkberry, maidencane, saw palmetto, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is suited to most cultivated crops, citrus crops, and pasture. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve soil quality.

If an adequate water control system is established and maintained, this soil is well suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of wetness. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderately high. Seedling mortality and the equipment use limitation are the main limitations. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitation. Wetness limits the use of equipment.

If this soil is used for building site development, the main management concerns are excessive wetness, slow permeability of the subsoil, and instability of the cutbanks. Drainage is needed to lower the high water table, and fill material is needed in most areas. Slow permeability and the high water table increase the possibility that the septic tank absorption fields will not function properly. Cutbanks are not stable and are subject to slumping.

This Malabar soil is in capability subclass IVw, in woodland group 10W, and in the Slough range site.

28—Millhopper-Urban land complex, 0 to 5 percent slopes. This complex consists of Millhopper soil that is nearly level to gently sloping and moderately well drained and of areas of Urban land. This complex is on the uplands.

This map unit consists of 45 to 60 percent Millhopper soil and 30 to 45 percent Urban land. The included soils make up 10 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Millhopper soil is very dark gray fine sand about 5 inches thick. The upper part of the subsurface layer, to a depth of 22 inches, is brown fine sand. The lower part, to a depth of 57 inches, is pale brown fine sand. The upper part of the subsoil, to a depth of about 64 inches, is light yellowish brown, mottled sandy loam. The lower part to a depth of about 80 inches is gray, mottled sandy clay loam. In some of the lower parts of the landscape, the soil is somewhat poorly drained, and in some of the higher parts, it is well drained. In places, the upper part of the subsoil is at a depth of 40 inches.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soil so that their identification is not feasible.

Included in mapping are Seffner and Tavares soils in small areas. Seffner soils are in lower positions on the landscape than Millhopper soil. Seffner soils are somewhat poorly drained. Tavares soils and Millhopper soil are in similar positions on the landscape. Tavares soils do not have a subsoil.

In most years, a seasonal high water table is at a depth of 40 to 60 inches for 1 to 4 months and recedes to a depth of 60 to 72 inches for 2 to 4 months. The permeability of Millhopper soil is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Millhopper soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concern is instability of cutbanks. Cutbanks are not stable and are subject to slumping. Plans for homesite development should provide for the preservation of as many trees as possible. Droughtiness, a result of the low available water capacity, is a limitation, especially during extended dry periods. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

29—Myakka fine sand. This soil is nearly level and poorly drained. It is on broad plains on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Myakka fine sand, the Myakka soil and similar soils make up 84 to 93 percent of the mapped areas. Dissimilar soils make up 7 to 16 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 20 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 25 inches, is black fine sand. The middle part, to a depth of 30 inches, is dark reddish brown fine sand. The lower part, to a depth of about 38 inches, is brownish yellow fine sand. The upper part of the substratum, to a depth of about 55 inches, is very pale brown fine sand. The lower part to a depth of about 80 inches is dark grayish brown fine sand. Similar soils included in mapping, in some areas, have a surface layer that is more than 8 inches thick. Other similar soils, in some places, have a subsoil within 20 inches of the surface, and some included similar soils have a subsoil at a depth of more than 30 inches or have a brown or dark brown subsoil, or both.

Dissimilar soils included in mapping are Basinger and Wabasso soils in small areas. Basinger soils are very poorly drained. Wabasso soils have a loamy subsoil below a sandy subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for 1 to 4 months and recedes to a depth of 40 inches during prolonged dry periods. Permeability is rapid in the surface and subsurface layers, moderate or moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is low.

In most areas, this Myakka soil is used for native pasture or cultivated crops. In a few areas, it is used for improved pasture or citrus crops, or it is used for homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is suited to most cultivated crops, citrus crops, and pasture. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve soil quality.

If a water control system is established and maintained, this soil is well suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderate. The main management concerns for producing and harvesting timber are the equipment use limitations and seedling mortality. Equipment use limitations are a concern if the soil is not properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitation.

If this soil is used for building site development, the main management concerns are excessive wetness, possible contamination of the ground water, and instability of cutbanks. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Septic tank absorption fields need to be mounded in most areas. If the density of housing is moderate to high, a community sewage system can help to prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping.

This Myakka soil is in capability subclass IVw, in woodland group 8W, and in the South Florida Flatwoods range site.

30—Myakka fine sand, frequently flooded. This soil is level and very poorly drained. It is in tidal areas. This soil is subject to shallow flooding by the highest of normal tides. It is also subject to occasional deep flooding by storm tides. Many small ponds and tidal channels are in this map unit. The slope is dominantly less than 1 percent.

In 80 percent of the areas mapped as Myakka fine sand, frequently flooded, the Myakka soil and similar soils make up 78 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 22 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 22 inches, is grayish brown fine sand. The subsoil, to a depth of about 40 inches, is very dark grayish brown fine sand. The substratum to a depth of about 80 inches is brown fine sand. Similar soils included in mapping, in some areas, have a surface layer of mucky fine sand, have a surface layer that is more than 8 inches thick, or have both. Other similar soils, in some places, have a subsoil at a depth of more than 30 inches.

Dissimilar soils included in mapping are small areas of unnamed soils. These soils are organic to a depth of 51 inches or more.

A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches. It is affected by tidal fluctuations. Permeability is rapid in the surface and subsurface layers, moderate or moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is low.

In most areas this Myakka soil has been left idle. In a few areas, it is used for urban development. The natural vegetation consists of mangrove trees, seashore saltgrass, glasswort, needlegrass rush, and marshhay cordgrass (fig. 4).

This soil is generally not suited to most cultivated crops or pasture or to the production of pine trees because of the flooding hazard and saline condition of the soil.

If this soil is used for building site development or for onsite waste disposal, tidal flooding is the main hazard. Drainage is needed to lower the high water table, and fill material is needed in most areas.

This Myakka soil is in capability subclass VIIIw. It has not been assigned to a woodland group. This soil is in the Saltwater Marsh range site.

32—Myakka-Urban land complex. This complex consists of Myakka soil that is nearly level and poorly drained and of areas of Urban land. This complex is on broad plains on the flatwoods. The slope is 0 to 2 percent.

This map unit consists of 40 to 60 percent Myakka soil and 30 to 45 percent Urban land (see fig. 5). The included soils make up 20 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Myakka soil is dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of 20 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 24 inches, is very

Figure 4.—These dense stands of mangrove trees on Myakka fine sand, frequently flooded, are in an important wetland area in Hillsborough County.

dark grayish brown fine sand. The middle part, to a depth of about 30 inches, is dark brown fine sand. The lower part, to a depth of 44 inches, is yellowish brown fine sand. The substratum to a depth of about 80 inches is pale brown fine sand. In some areas, the surface layer is more than 8 inches thick. In places, the upper part of the subsoil is at a depth of 20 inches.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Basinger, Wabasso, and Zolfo soils in small areas. Basinger soils are very poorly drained. They are in shallow depressions and along drainageways. Wabasso soils have a loamy subsoil below a sandy subsoil. These soils are in similar positions on the flatwoods as Myakka soil. Generally, Wabasso soils are more prevalent in the eastern part of the county and in areas adjoining Tampa Bay. Zolfo soils are somewhat poorly drained. They are in similar positions on the flatwoods as Myakka soils.

In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal high water table that fluctuates from the soil surface to a depth of about 10 inches for 1 to 4 months. The

seasonal high water table recedes to a depth of 40 inches during prolonged dry periods. The permeability of Myakka soil is rapid in the surface and subsurface layers, moderate or moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Myakka soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are excessive wetness, possible contamination of ground water, and instability of cutbanks. The soils in most areas of this map unit are artificially drained. Drainage is needed to lower the water table, and fill material is needed in undrained areas for building site development. Septic tank absorption fields need to be mounded in most areas. If the density of housing is moderate to high, a community sewage system can help to prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping. Plans for homesite development should provide for the preservation of as many trees as possible. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

33—Ona fine sand. This soil is nearly level and poorly drained. It is on broad plains on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Ona fine sand, the Ona soil and similar soils make up 84 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 16 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 4 inches thick. The upper part of the subsoil, to a depth of about 8 inches, is black fine sand. The lower part, to a depth of about 22 inches, is very dark brown fine sand. The substratum to a depth of about 80 inches is light gray fine sand. Similar soils included in mapping, in some areas, have a gray or dark gray subsurface layer. Other similar soils, in some places, have a subsoil at a depth of more than 10 inches.

Dissimilar soils included in mapping are Basinger and Immokalee soils in small areas. Basinger soils are very poorly drained. Immokalee soils have a subsurface layer.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for more than 2 months and recedes to a depth of 10 to 40 inches for 6 months or more. Permeability is rapid in the surface layer, moderate or moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is low or moderate.

In most areas, this Ona soil is used for native pasture. In a few areas, it is used for cultivated crops, improved pasture, or citrus crops or for homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn, and waxmyrtle.

If an adequate water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops and pasture. If drained, this soil is moderately suited to citrus crops in areas that are relatively free from freezing temperatures. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Droughtiness, a result of the low or moderate available water capacity, is a concern in management especially during extended dry periods. This soil is suited to most irrigation systems. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility. Frequent applications of fertilizer and lime generally are needed to improve crop production.

If a water control management system is established and maintained, this soil is well suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pine trees is moderately high. Equipment use limitations and seedling mortality are the main limitations. Equipment use limitations are a management concern unless the soil is properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the limitations caused by excessive wetness.

If this soil is used for building site development, the main management concerns are excessive wetness, possible contamination of ground water, and instability of cutbanks. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Septic tank absorption fields need to be mounded in most areas. If the density of housing is moderate to high, a community sewer system can help prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping.

Figure 5.—This residential area was developed on soils in the Myakka-Urban land complex.

This Ona soil is in capability subclass IIIw, in woodland group 10W, and in the South Florida Flatwoods range site.

34—Ona-Urban land complex. This complex consists of Ona soil that is nearly level and poorly drained and of areas of Urban land. This complex is on the flatwoods. The slope is 0 to 2 percent.

This map unit consists of 45 to 60 percent Ona soil and 30 to 45 percent Urban land. The included soils make up 6 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Ona soil is black fine sand about 4 inches thick. The subsoil, to a depth of 18 inches, is dark reddish brown fine sand. The upper part of the substratum, to a depth of about 40 inches, is grayish brown, mottled fine sand. The lower part to a depth of about 80 inches is light gray fine sand. In places, this soil has a subsurface layer that is gray or dark gray. In places, the upper part of the subsoil is at a depth of more than 10 inches.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Basinger and Immokalee soils in small areas. Basinger soils are very poorly drained and are in depressions and along drainageways. Immokalee soils have a subsurface layer and are in slightly higher positions on the flatwoods than Ona soil.

In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal high water table that fluctuates from the soil surface to a depth of about 10 inches for more than 2 months. The high water table recedes to a depth of 10 to 40 inches for 6 months or more. The permeability of Ona soil is rapid in the surface layer, moderate or moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is low or moderate.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Ona soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are excessive wetness, possible contamination of ground water, and instability of cutbanks. The soils in most mapped areas are artificially drained. Drainage is needed to lower the high water table, and fill material is needed in undrained areas for building site development. Septic tank absorption fields need to be mounded in most areas. If the density of housing is moderate to high, a community sewage system is needed to prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping. Plans for homesite development should provide for the preservation of as many trees as possible. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

35—Orlando fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and well drained. It is on the uplands.

In 95 percent of the areas mapped as Orlando fine sand, 0 to 5 percent slopes, the Orlando soil and similar soils make up 92 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 8 percent of the mapped areas.

Typically, this soil has a surface layer that is about 20 inches thick. The upper 8 inches is black fine sand. The lower 12 inches is very dark gray fine sand. The next layer, to a depth of about 22 inches, is dark grayish brown fine sand. The upper part of the underlying material, to a depth of about 60 inches, is yellowish brown fine sand. The lower part to a depth of about 80 inches is pale brown fine sand. Similar soils included in mapping, in some areas, have a surface layer that is less than 10 inches thick. Other similar soils, in some places, have a weakly indurated layer at a depth of more than 40 inches. Also, similar soils in some of the lower parts of the landscape are moderately well drained.

Dissimilar soils included in mapping are Seffner and Candler soils in small areas. Seffner soils are somewhat poorly drained. Candler soils are excessively drained.

A seasonal high water table is below a depth of more than 72 inches. Permeability is rapid. The available water capacity is low.

In most areas, this Orlando soil is used for cultivated crops or citrus crops. In a few areas, it is used for pasture or for homesite or urban development. The natural vegetation consists of bluejack oak, live oak, turkey oak, and slash pine. The understory includes panicum, saw palmetto, and pineland threeawn.

This soil is well suited to citrus crops in areas that are relatively free of freezing temperatures. If this soil is used for cultivated crops, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and the potential yield of crops. Droughtiness, a result of the low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system will help to maintain optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a

cropping system that includes grasses, legumes, or a grass-legume mixture help to conserve moisture, maintain fertility, and control erosion.

This soil is well suited to pasture. The low available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pine trees is moderately high. This soil has few limitations for woodland use and management. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants.

If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Orlando soil is in capability subclass IIIs, in woodland group 10S, and in the Longleaf Pine-Turkey Oak Hills range site.

36—Orsino fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and moderately well drained. It is on the uplands and along slope breaks to stream channels.

In 90 percent of the areas mapped as Orsino fine sand, 0 to 5 percent slopes, the Orsino soil and similar soils make up 83 to 99 percent of the mapped areas. Dissimilar soils make up to 17 percent of the mapped areas.

Typically, this soil has a surface layer of gray fine sand about 2 inches thick. The upper part of the subsurface layer, to a depth of about 15 inches, is light gray fine sand. The lower part, to a depth of about 31 inches, is white fine sand. The upper part of the subsoil, to a depth of about 48 inches, is brownish yellow and very dark grayish brown fine sand. The lower part, to a depth of 72 inches, is yellow, mottled fine sand. The substratum to a depth of about 80 inches is pale brown fine sand. Similar soils included in mapping, in some areas, are well drained. Other similar soils, in some of the lower parts of the landscape, have a brown or dark brown subsoil. Also, similar soils, in some areas, have a subsoil at a depth of 80 inches or more.

Dissimilar soils included in mapping are Archbold, Immokalee, and Millhopper soils in small areas. Archbold soils do not have a subsoil. Immokalee soils are poorly drained. Millhopper soils have a loamy subsoil.

In most years, a seasonal high water table is at a depth of 40 to 60 inches for more than 6 months and recedes to a depth of more than 60 inches during prolonged dry periods. Permeability is very rapid. The available water capacity is low or very low.

In most areas, this Orsino soil is used for pasture. In a few areas, it is used for homesite or urban development or is left in natural vegetation. The natural vegetation consists of turkey oak, sand pine, and slash pine. The understory includes sand heath, pineland threeawn, saw palmetto, and pricklypear cactus.

This soil is suited to citrus crops in areas that are relatively free of freezing temperatures. If this soil is used for cultivated crops, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yield of crops. Droughtiness, a result of the low to very low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system will help to maintain optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility.

This soil is moderately suited to pasture. The low or very low available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrasses, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of sand pines and slash pines is moderate. The main management concern for producing and harvesting timber is seedling mortality. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Proper site preparation controls initial plant competition, and spraying controls subsequent growth.

If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Orsino soil is in capability subclass IVs, in woodland group 8S, and in the Sand Pine Scrub range site.

37—Paisley fine sand, depressional. This soil is level and very poorly drained. It is in depressions and sloughs. Undrained areas are frequently ponded for very

long periods. The slope is dominantly less than 1 percent.

In 80 percent of the areas mapped as Paisley fine sand, depressional, the Paisley soil and similar soils make up 82 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 18 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 2 inches thick. The subsurface layer, to a depth of about 4 inches, is grayish brown fine sand. The upper part of the subsoil, to a depth of about 24 inches, is gray, mottled sandy clay. The lower part to a depth of about 80 inches is light gray, mottled sandy clay. Similar soils included in mapping, in some places, have a calcareous subsoil. Other similar soils, in some areas, have a surface layer that is mucky fine sand or sandy loam. In some places, the upper part of the subsoil of similar soils is at a depth of more than 20 inches.

Dissimilar soils included in mapping are Basinger and Wabasso soils in small areas. Basinger soils do not have a subsoil. Wabasso soils have a sandy subsoil above a loamy subsoil.

A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for periods of 9 months or more. Permeability is rapid in the surface and subsurface layers and slow in the subsoil. The available water capacity is high.

In most areas, this Paisley soil has been left in natural vegetation. In some areas, it has been drained and is used for pasture. The natural vegetation consists of cypress and sweetgum. The understory includes sand cordgrass, bluestem, maidencane, and waxmyrtle.

In its natural state, this soil is generally not suited to cultivated crops. If an adequate water control system, such as dikes, ditches, and pumps, is established and maintained, this soil is suited to use for most cultivated crops and as pasture.

This soil is generally not suited to the production of pine trees because of ponding or extended wetness. It may be suited to the production of cypress and hardwoods through natural regeneration.

If this soil is used for building site development or for onsite waste disposal, ponding is the main hazard. While surface drainage helps to control ponding, the seasonal high water table is a continuing limitation.

This Paisley soil is in capability subclass VIIw, in woodland group 2W, and in the Freshwater Marshes and Ponds range site.

38—Pinellas fine sand. This soil is nearly level and poorly drained. It is on broad plains on the flatwoods. Slope is 0 to 2 percent.

In 90 percent of the areas mapped as Pinellas fine sand, the Pinellas soil and similar soils make up 83 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 17 percent of the mapped areas.

Typically, this soil has a surface layer of black fine sand about 4 inches thick. The subsurface layer, to a depth of about 11 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 22 inches, is calcareous, light gray, mottled fine sand. The lower part, to a depth of about 27 inches, is light olive gray, mottled sandy clay loam. The substratum to a depth of about 80 inches is greenish gray, very shelly, loamy sand. Similar soils included in mapping, in some areas, have a subsoil at a depth of more than 40 inches.

Dissimilar soils included in mapping are Malabar and Wabasso soils in small areas. These soils do not have a calcareous layer above the subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for less than 3 months and recedes to a depth of more than 40 inches during prolonged dry periods. Permeability is rapid in the surface and subsurface layers, moderate in the subsoil, and rapid in the substratum. The available water capacity is low or moderate.

In most areas, this Pinellas soil is used for cultivated crops or pasture. In a few areas, it is used for homesite or urban development. The natural vegetation consists of cabbage palm, longleaf pine, and slash pine. The understory includes lopsided indiangrass, running oak, saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops. If suitable outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility.

This soil is suited to pasture. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is moderate. The main management concerns for producing and harvesting timber are the equipment use limitations, which are a concern if the soil is not properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitation.

If this soil is used for building site development, the main management concerns are excessive wetness and instability of cutbanks. Drainage is needed to lower the high water table, and fill material is needed in most areas. Septic tank absorption fields need to be mounded in most areas. Cutbanks are not stable and are subject to slumping.

This Pinellas soil is in capability subclass IIIw, in woodland group 8W, and in the Cabbage Palm Flatwoods range site.

39—Arents, very steep. This map unit consists of mounds of very steep, heterogenous soil material. These Arents are the accumulation of material from phosphate mining operations.

This map unit is not associated with or confined to a particular kind of soil. Arents do not have an orderly sequence of soil layers. They are variable and contain discontinuous lenses, pockets, or streaks of black, gray, grayish brown, brown, or yellowish brown sandy or loamy excavated material. The thickness of the excavated material ranges from 3 to 15 feet or more.

Included in this map unit are small areas of water.

Most soil properties of Arents are variable. The depth to the seasonal high water table will vary with the amount of excavated material and artificial drainage. The permeability and the available water capacity vary widely from one area to another.

Phosphate mining operations are inactive in most areas. A few areas have active operations. Present land use and slope precludes the use of this map unit for cultivated crops, pasture, commercial trees, or building site development. An individual assessment of each site is necessary to determine its potential for different uses.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

41—Pomello fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and moderately well drained. It is on low ridges on the flatwoods.

In 95 percent of the areas mapped as Pomello fine sand, 0 to 5 percent slopes, the Pomello soil and similar soils make up 75 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 25 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 3 inches thick. The subsurface layer, to a depth of about 43 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 46 inches, is dark brown fine sand. The lower part, to a depth of about 55 inches, is brown fine sand. The substratum to a depth of about 80 inches is grayish brown fine sand. Similar soils included in mapping, in some places, have a subsoil within 30 inches of the surface. Other similar soils, in some areas, have a subsoil at a depth of more than 50 inches, and similar soils, in some of the lower parts of the landscape, are somewhat poorly drained.

Dissimilar soils included in mapping are Immokalee and Smyrna soils in small areas. These soils are poorly drained.

In most years, a seasonal high water table is at a depth of 24 to 40 inches for 1 to 4 months and recedes to a depth of 40 to 60 inches during dry periods. Permeability is very rapid in the surface and subsurface layers, moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is very low.

In most areas, this Pomello soil is used for native pasture. In a few areas, it is used for citrus crops, cultivated crops, or improved pasture or for homesite or urban development. The natural vegetation consists of longleaf pine, sand pine, and slash pine. The understory includes creeping bluestem, lopsided indiangrass, running oak, saw palmetto, and pineland threeawn.

This soil is generally not suited to most cultivated crops and citrus crops because of droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yield of all crops. Droughtiness, a result of the very low available water capacity, is a management concern, especially during extended dry periods.

This soil is poorly suited to pasture. The very low available water capacity of the soil limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of sand pines and slash pines is moderate. The main management concerns for producing and harvesting timber are the equipment use limitations and seedling mortality. The fine sand texture of the surface layer limits the use of equipment. The very low available water capacity adversely affects seedling survival in areas where understory plants are numerous.

If this soil is used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Pomello soil is in capability subclass VIs, in woodland group 8S, and in the Sand Pine Scrub range site.

42—Pomello-Urban land complex, 0 to 5 percent slopes. This complex consists of Pomello soil that is nearly level to gently sloping and moderately well drained and of areas of Urban land. This complex is on low ridges on the flatwoods.

This map unit consists of 45 to 60 percent Pomello soil and 30 to 45 percent Urban land. The included soils make up 25 percent or less of the map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Pomello soil is dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 42 inches, is white fine sand. The upper part of the subsoil, to a depth of about 48 inches, is very dark brown fine sand. The lower part, to a depth of

about 54 inches, is brown fine sand. The substratum to a depth of about 80 inches is white fine sand. In places, the upper part of the subsoil is within 30 inches of the soil surface. In places, the upper part of the subsoil is at a depth of more than 50 inches. In some of the lower parts of the landscape, the soil is somewhat poorly drained.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Felda, Immokalee, and Smyrna soils in small areas. These soils are poorly drained and are in slightly lower positions on the landscape than Pomello soil.

In most years, a seasonal high water table is at a depth of 24 to 40 inches for 1 to 4 months and recedes to a depth of 40 to 60 inches during dry periods. The permeability of Pomello soil is very rapid in the surface and subsurface layers, moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is very low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Pomello soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water. Population growth has resulted in increased construction of houses on this soil. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help to prevent contamination of water supplies by seepage. Droughtiness, a result of the very low available water capacity, is a limitation, especially during extended dry periods. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

43—Quartzipsamments, nearly level. These soils are nearly level and moderately well drained to excessively drained. They formed in accumulations of sand from phosphate mining operations. Quartzipsamments generally are confined to areas in specially constructed basins. Sand, a by-product of phosphate mining operations, has been pumped into these basins and allowed to dry.

The color and thickness of these soils vary from one area to another, but one of the more common profiles has a surface layer of mixed dark gray, gray, and light gray fine sand about 15 inches thick. Below the surface layer, to a depth of about 55 inches, is pale brown fine sand. Below that layer to a depth of more than 80 inches is light brownish yellow fine sand.

Included in mapping are natural soils in small areas, which have not been altered, and sand tailings with inclusions of loamy or clayey bodies (slickens). In areas where slickens have been added, the amount of clay in the soil is variable. The variations in the amount of clay is caused by the differential settling velocity of sand and slickens. In some places, the clay has been carried by the water, has settled, and has formed slight depressions on the landscape. Also included are small areas of Haplaquents, small areas of soil that has slope ranging from 0 to 5 percent, and small depressions with intermittent pools of water.

Quartzipsamments have a variable water table that is dependent upon the water table of the surrounding soils. In most areas, the seasonal high water table is at a depth of more than 72 inches. In some areas, the seasonal high water table fluctuates between depths of 20 to 72 inches of the surface. Permeability is variable but generally is very rapid. The available water capacity is also variable but generally is very low.

In most areas, these soils are used for pasture or have been left idle. A few areas are used for homesite or urban development.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

44—St. Augustine fine sand. This soil is nearly level and somewhat poorly drained. It is on flats and ridges bordering Tampa Bay. It is subject to flooding for very brief periods during hurricanes. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as St. Augustine fine sand, the St. Augustine soil and similar soils make up 91 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 9 percent of the mapped areas.

Typically, this soil has a surface layer of dark gray fine sand about 3 inches thick. The upper part of the underlying material, to a depth of about 12 inches, is light brownish gray fine sand. The middle part, to a depth of about 30 inches, is light gray, mottled fine sand containing balls of sandy clay. The lower part to a depth of about 80 inches is gray fine sand. Similar soils included in mapping, in some areas, have a surface layer of sandy loam or loamy sand. Other similar soils, in some places, have an underlying material that consists of stratified lenses of sandy clay loam, clay loam, or loamy sand.

Dissimilar soils included in mapping are Kesson and Myakka soils in small areas. Kesson soils are very poorly drained. Myakka soils are poorly drained.

In most years, a seasonal high water table is at a depth of 20 to 30 inches for 2 to 6 months and recedes to a depth of 50 inches during prolonged dry periods.

Permeability is moderately rapid or rapid. The available water capacity is low.

In most areas, this St. Augustine soil has been left idle as open space. In a few areas, it is used for homesite or urban development. The natural vegetation consists of waxmyrtle, greenbrier, blackberry, and panicum.

This soil is generally not suited to most cultivated crops, citrus crops, or pasture or for the production of pine trees because of droughtiness, rapid leaching of plant nutrients, and the saline condition of the soil.

The potential of this soil for the production of longleaf pines and slash pines is very low. The main management concerns are the equipment use limitations and seedling mortality. Seedling mortality is increased because of droughtiness and the saline condition of the soil.

If this soil is used for building site development, the main management concerns are excessive wetness and instability of cutbanks. Population growth has resulted in increased construction of houses on this soil. In most areas, this soil is artificially drained by surface drains and ditches. Cutbanks are not stable and are subject to slumping. Selection of vegetation that is adapted to this soil is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. This soil is subject to flooding for very brief periods during severe hurricanes, but tropical storms of hurricane intensity very rarely affect Hillsborough County.

This St. Augustine soil is in capability subclass VIIs. This soil has not been assigned to a woodland group or to a range site.

45—St. Augustine-Urban land complex. This complex consists of St. Augustine soil that is nearly level and somewhat poorly drained and of areas of Urban land. This complex is on flats and slight ridges bordering Tampa Bay. These soils are subject to flooding for very brief periods during the hurricane season. The slope is 0 to 2 percent.

This map unit consists of 50 to 60 percent St. Augustine soil and 30 to 45 percent Urban land. The included soils make up 9 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of St. Augustine soil is dark gray fine sand about 3 inches thick. The upper part of the underlying material, to a depth of about 20 inches, is brown fine sand. The middle part, to a depth of 37 inches, is light brownish gray, mottled fine sand. The lower part to a depth of about 80 inches is gray, mottled fine sand. In some areas, the surface layer is loamy sand.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Kesson and Myakka soils in small areas. These soils are very poorly drained and are in lower-lying areas in tidal swamps and marshes.

In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal high water table at a depth of about 20 to 30 inches for 2 to 6 months. The high water table recedes to a depth of 50 inches during prolonged dry periods. The permeability of St. Augustine soil is moderately rapid or rapid. The available water capacity is low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. St. Augustine soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries, or it is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are excessive wetness and instability of cutbanks. In most areas, the soils in this map unit are artificially drained. Cutbanks are not stable and are subject to slumping. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Droughtiness, a result of the low available water capacity, is a limitation, especially during extended dry periods. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants. The soils in this map unit are subject to flooding for very brief periods during severe hurricanes, but tropical storms of hurricane intensity very rarely affect Hillsborough County.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

46—St. Johns fine sand. This soil is nearly level and poorly drained. It is on low-lying plains on the flatwoods. The slope is 0 to 2 percent.

In 80 percent of the areas mapped as St. Johns fine sand, the St. Johns soil and similar soils make up 76 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 24 percent of the mapped areas.

Typically, the upper part of the surface layer is black fine sand about 6 inches thick. The lower part, to a depth of about 12 inches, is very dark grayish brown fine sand. The subsurface layer, to a depth of about 29 inches, is light brownish gray fine sand. The upper part of the subsoil, to a depth of about 36 inches, is black fine sand. The middle part, to a depth of about 46 inches, is dark reddish brown fine sand. The lower part, to a depth of about 50 inches, is dark yellowish brown fine sand. The substratum to a depth of about 80 inches is light brownish gray fine sand. Similar soils included in mapping, in some areas, have a surface layer that is less than 10 inches thick. Other similar soils, in some places, do not have a subsurface layer; and in some places,

these included soils have a subsoil that is brown or dark brown.

Dissimilar soils included in mapping are Basinger soils in small areas. Basinger soils are very poorly drained. Also included are unnamed soils that have a surface layer that is 10 to 24 inches thick and have a loamy layer at a depth of more than 40 inches.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 15 inches for 2 to 6 months and recedes to a depth of 15 to 30 inches during prolonged dry periods. Permeability is rapid in the surface and subsurface layers, moderately slow or moderate in the subsoil, and rapid in the substratum. The available water capacity is moderate.

In most areas, this St. Johns soil is used for native pasture. In a few areas, it is used for cultivated crops or improved pasture or for homesite or urban development.

The natural vegetation consists of longleaf pine and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops and pasture. If drained, this soil is moderately suited to citrus crops in areas that are relatively free of freezing temperatures. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Droughtiness, a result of the moderate available water capacity, is a management concern especially during extended dry periods. This soil is suited to most irrigation systems. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve crop production.

If a water control system is established and maintained, this soil is well suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderately high. Equipment use limitations and seedling mortality are the main limitations. Equipment use limitations are a concern in management if the soil is not properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods.

If this soil is used for building site development, the main management concerns are excessive soil wetness, possible contamination of the ground water, and instability of cutbanks. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Septic tank absorption fields need to be mounded in most areas. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping.

This St. Johns soil is in capability subclass IIIw, in woodland group 10W, and in the South Florida Flatwoods range site.

47—Seffner fine sand. This soil is nearly level and somewhat poorly drained. It is on the rims of depressions and on broad, low ridges on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Seffner fine sand, the Seffner soil and similar soils make up 84 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 16 percent of the mapped areas.

Typically, this soil has a surface layer that is about 13 inches thick. The upper 9 inches is very dark gray fine sand, and the lower 4 inches is very dark gray, mottled fine sand. A transitional layer, to a depth of about 21 inches, is dark gray, mottled fine sand. The upper part of the underlying material, to a depth of about 35 inches, is very pale brown, mottled fine sand. The middle part, to a depth of about 63 inches, is light gray, mottled fine sand. The lower part to a depth of 80 inches is white, mottled fine sand. Similar soils included in mapping, in some areas, have a surface layer that is less than 10 inches thick. Other similar soils, in some places, have a surface layer that is more than 24 inches thick; and in some of the higher parts of the landscape, the included similar soils are moderately well drained.

Dissimilar soils included in mapping are Ona and Smyrna soils in small areas. These soils are poorly drained.

In most years, a seasonal high water table is at a depth of 20 to 40 inches for 2 to 6 months and recedes to a depth of less than 60 inches during prolonged dry periods. Permeability is rapid. The available water capacity is low or moderate.

In most areas, this Seffner soil is used for cultivated crops or pasture or for homesite and urban development. In a few areas, it is used for citrus crops or has been left idle in natural vegetation. The natural vegetation consists of longleaf pine, slash pine, and laurel oak. The understory includes creeping bluestem, grassleaf goldaster, lopsided indiangrass, saw palmetto, and pineland threeawn.

If a water-control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops, citrus crops, and pasture. If suitable outlets are available, lateral ditches and tile drains can be used to lower the water table. Droughtiness, a result of the low to moderate available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system will help to maintain

optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve soil quality.

This soil is well suited to pasture. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is high. This soil has few limitations for woodland use and management.

If this soil is used for building site development, the main management concerns are excessive soil wetness, instability of cutbanks, and possible contamination of the ground water. Drainage is needed to lower the high water table, and fill material is needed in most areas. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields are mounded in most areas. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Seffner soil is in capability subclass IIIw, in woodland group 10W, and in the Oak Hammocks range site.

50—Slickens. This miscellaneous area consists of level, very poorly drained accumulations of fine-textured material from phosphate mining operations. Slickens generally are confined in specially constructed basins or holding ponds. The basins are designed to allow water to flow through a series of holding ponds and allow the slickens to settle out. These areas are ponded for very long periods. The slope is less than 1 percent.

Slickens do not have an orderly sequence of soil layers. Typically, the slickens are gray or light gray and have mottles in various hues, values, and chromas. Slickens are clayey and contain about 88 percent clay, 8 percent silt, and 4 percent sand. The clay mainly is montmorillonite but includes kaolinite, illite, and attapulgite. The clayey material is fluid or very fluid throughout except, in some places, the upper few inches are firm.

Included with this soil in mapping are Quartzipsamments in small areas. Also included are short, steep to very steep slopes of exposed encircling dikes.

In most years, undrained areas are ponded except during extended dry periods. A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches. Permeability is very slow. The available water capacity is high.

Most areas in this map unit have been left idle. Slickens generally do not support vegetation. They also are too soft and boggy to support livestock. Slickens are not suited to cultivated crops, pasture, or commercial trees. An individual assessment of each site is necessary to determine its potential for different uses.

The soils in this unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

51—Haplaquents, clayey. This soil is nearly level and very poorly drained. It formed in accumulations of fine-textured material from phosphate mining operations. Haplaquents are confined in specially constructed basins that are surrounded by short, steep dikes. Undrained areas are ponded for very long periods. The slope is less than 1 percent.

Typically, the surface layer is dark grayish brown clay about 3 inches thick. The underlying material to a depth of about 80 inches is gray clay that has mottles in various hues, values, and chromas. The clay is consolidated and will support the weight of livestock. Generally, Haplaquents range in thickness from about 3 feet near the edges to more than 30 feet in the centers of the basins. These soils contain about 88 percent clay, 8 percent silt, and 4 percent sand. The clay is principally montmorillonite but includes kaolinite, illite, and attapulgite.

Included in mapping are Slickens, Quartzipsamments, and water in small areas. Also included are short, steep to very steep slopes of exposed encircling dikes.

In most years, undrained areas of this map unit are ponded except during dry periods. A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches. Permeability is variable but generally is very slow. The available water capacity is high.

In most areas, this soil is used as pasture or has been left idle in natural vegetation. The natural vegetation consists of primrose willow and Coastal Plain willow. The understory includes smartweed, maidencane, and cattails. An individual assessment of each site is necessary to determine its potential for different uses.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

52—Smyrna fine sand. This soil is nearly level and poorly drained. It is on broad, low-lying, convex swells on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Smyrna fine sand, the Smyrna soil and similar soils make up 90 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 10 percent of the mapped areas.

Typically, the soil has a surface layer of very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 12 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 15 inches, is dark brown fine sand. The lower part, to a depth of about 20 inches, is very dark grayish brown fine sand. The upper part of the substratum, to a depth of about 45 inches, is light brownish gray, mottled fine sand. The lower part to

a depth of about 80 inches is brown fine sand. Similar soils included in mapping, in some areas, have a surface layer that is more than 8 inches thick. Other similar soils, in some areas, do not have a subsurface layer. In some places, the similar soils have subsoil at a depth of more than 20 inches.

Dissimilar soils included in mapping are Pomello and Wabasso soils in small areas. Pomello soils are moderately well drained. Wabasso soils have a loamy subsoil or sandy subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for more than 2 months and recedes to a depth of 10 to 40 inches for 6 months or more. Permeability is rapid in the surface and subsurface layers, moderate or moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is low.

In most areas, this Smyrna soil is used for native pasture. In a few areas, it is used for cultivated crops, improved pasture, or citrus crops or for homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is suited to most cultivated crops, citrus crops, and pasture. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent application of fertilizer and lime are generally needed to improve crop production.

If a water control management system is established and maintained, this soil is well suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderately high. Equipment use limitations and seedling mortality are the main limitations. Equipment use limitations are a concern if the soil is not properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitation.

If this soil is used for building site development, the main management concerns are excessive wetness, possible contamination of the ground water, and instability of cutbanks. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Septic tank absorption fields are mounded in most areas. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping.

This Smyrna soil is in capability subclass IVw, in woodland group 10W, and in the South Florida Flatwoods range site.

53—Tavares-Millhopper fine sands, 0 to 5 percent slopes. The soils in this map unit are nearly level to gently sloping and moderately well drained. They are in low-lying areas on the uplands and on low ridges on the flatwoods.

In 95 percent of the areas of this map unit, Tavares-Millhopper fine sands, 0 to 5 percent slopes, and similar soils make up 87 to 99 percent of the mapped area, and dissimilar soils make up 1 to 13 percent of the mapped areas. Generally, the mapped areas consist of about 63 percent Tavares soil and similar soils and 26 percent Millhopper soil and similar soils.

Typically, the surface layer of the Tavares soil is dark grayish brown fine sand about 6 inches thick. The upper part of the underlying material, to a depth of about 32 inches, is pale brown fine sand. The middle part, to a depth of about 40 inches, is very pale brown fine sand. The lower part to a depth of about 80 inches is light gray fine sand. Similar soils included in mapping, in some areas, have a brown or dark brown layer in the lower part of the underlying material. Other similar soils, in some of the lower parts of the landscape, are somewhat poorly drained.

Typically, the surface layer of the Millhopper soil is dark gray fine sand about 4 inches thick. The upper part of the subsurface layer, to a depth of about 9 inches, is brown fine sand. The next layer, to a depth of about 25 inches, is light yellowish brown fine sand. The next layer, to a depth of about 48 inches, is light gray, mottled fine sand. The lower part, to a depth of about 57 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 62 inches, is very pale brown, mottled sandy clay loam. The lower part to a depth of about 80 inches is gray, mottled sandy clay loam. Similar soils included in mapping, in some areas, have a dark surface layer more than 10 inches thick.

Dissimilar soils which are included in this map unit are Candler, Myakka, and Smyrna soils in small areas. Candler soils are excessively drained. Myakka and Smyrna soils are poorly drained.

Tavares soil has a seasonal high water table at a depth of 40 to 80 inches for more than 6 months, and it recedes to a depth of more than 80 inches during prolonged dry periods. Millhopper soil has a seasonal high water table at a depth of 40 to 60 inches for 1 to 4 months, and it recedes to a depth of 60 to 72 inches for 2 to 4 months. Permeability of Tavares soil is rapid. Permeability of Millhopper soil is rapid in the surface and subsurface layers and moderate in the subsoil. The

available water capacity is very low in Tavares soil and low in Millhopper soil.

In most areas, the soils in this map unit are used for pasture or homesite and urban development. In a few areas, they are used for cultivated crops or citrus crops or are left in natural vegetation. The natural vegetation consists of bluejack oak, turkey oak, live oak, and longleaf pine. The understory includes creeping bluestem, lopsided indiangrass, panicum, and pineland threeawn (fig. 6).

The soils in this map unit are well suited to citrus crops in areas that are relatively free of freezing temperatures. If these soils are used for cultivated crops or as pasture, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and reduce the potential yield of crops. Droughtiness, a result of the very low or low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system will help to maintain optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to conserve moisture, maintain fertility, and control erosion.

Figure 6.—This area of Tavares-Millhopper fine sands, 0 to 5 percent slopes, has been left in natural vegetation. These soils are in the Longleaf Pine-Turkey Oak Hills range site.

The soils in this map unit are well suited to pasture. The very low or low available water capacity of the soils limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of these soils for the production of slash pines is moderately high. The main management concerns for producing and harvesting timber are the equipment use limitations and seedling mortality. The fine sand texture of the surface layer limits the use of equipment. The very low or low available water capacity adversely affects seedling survival in areas where understory plants are numerous.

If the soils in this map unit are used for building site development, the main management concerns are instability of cutbanks and possible contamination of the ground water in Tavares soil. Population growth has resulted in increased construction of houses on these soils. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

The soils in this map unit are in capability subclass IIIs, in woodland group 10S, and in the Longleaf Pine-Turkey Oak Hills range site.

54—Tavares-Millhopper fine sands, 5 to 8 percent slopes. The soils in this map unit are moderately sloping and moderately well drained. They are on the uplands that border ponds, lakes, and streams. Tavares soil is on the summit and lower side slopes. Millhopper soil is on the upper side slopes.

In 80 percent of the areas of this map unit, Tavares-Millhopper fine sands, 5 to 8 percent slopes, and similar soils make up 78 to 99 percent of the mapped areas, and dissimilar soils make up 1 to 22 percent of the mapped areas. Generally, the mapped areas consist of about 70 percent Tavares soil and similar soils and 26 percent Millhopper soil.

Typically, the surface layer of the Tavares soil is very dark gray fine sand about 3 inches thick. The upper part of the underlying material, to a depth of about 21 inches, is light yellowish brown fine sand. The middle part, to a depth of about 40 inches, is pale brown fine sand. The lower part to a depth of about 80 inches is pale brown, mottled fine sand. Similar soils included in mapping, in some areas, have a surface layer more than 9 inches thick.

Typically, the surface layer of the Millhopper soil is dark grayish brown fine sand about 5 inches thick. The upper part of the subsurface layer, to a depth of about 26 inches, is light yellowish brown fine sand. The middle part, to a depth of about 38 inches, is very pale brown, mottled fine sand. The lower part, to a depth of about 54 inches, is white fine sand. The upper part of the subsoil, to a depth of about 64 inches, is light yellowish brown, mottled loamy fine sand. The lower part to a depth of about 80 inches is pale brown, mottled fine sandy loam.

Dissimilar soils included in mapping are Candler soils in small areas. These soils are excessively drained.

Tavares soil has a seasonal high water table at a depth of 40 to 80 inches for more than 6 months, and it recedes to a depth of more than 80 inches during prolonged dry periods. Millhopper soil has a seasonal high water table at a depth of 40 to 60 inches for 1 to 4 months, and it recedes to a depth of 60 to 72 inches for 2 to 4 months. Permeability of Tavares soil is rapid. Permeability of Millhopper soil is rapid in the surface and subsurface layers and moderately rapid or moderate in the subsoil. The available water capacity is very low in Tavares soil and low in Millhopper soil.

In most areas, the soils in this map unit are used as pasture or for homesites or urban development. In a few areas, they are used for citrus crops or are left in natural vegetation. The natural vegetation consists of bluejack oak, turkey oak, live oak, and longleaf pine. The understory includes creeping bluestem, lopsided indiangrass, panicum, and pineland threeawn.

The soils in this map unit are suited to citrus crops in areas that are relatively free of freezing temperatures. If these soils are used for cultivated crops or pasture, the main limitations are droughtiness and the rapid leaching of plant nutrients, which limit the choice of plants that can be grown and the potential yield of crops. Droughtiness, a result of the very low to low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system will help to maintain optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility, conserve moisture, and control erosion.

The soils in this map unit are moderately suited to pasture. The very low or low available water capacity of the soils limits production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of these soils for the production of slash pines is moderately high. The main management concerns for producing and harvesting timber are equipment use limitations and seedling mortality. The fine sand texture of the surface layer limits the use of equipment. The very low or low available water capacity generally affects seedling survival in areas where understory plants are numerous.

If the soils in this map unit are used for building site development, the main management concerns are the

instability of cutbanks and possible contamination of the ground water. Population growth has resulted in increased construction of houses on these soils. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage in areas of Tavares soil.

The soils in this map unit are in capability subclass IVs, in woodland group 10S, and in the Longleaf Pine-Turkey Oak Hills range site.

55—Tavares-Urban land complex, 0 to 5 percent slopes. This complex consists of Tavares soil that is nearly level to gently sloping and moderately well drained and of areas of Urban land. This complex is in low-lying areas on the uplands and on low ridges on the flatwoods.

This map unit consists of 45 to 60 percent Tavares soil and 30 to 45 percent Urban land. The included soils make up 25 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Tavares soil is very dark gray fine sand about 6 inches thick. The upper part of the underlying material, to a depth of about 18 inches, is light yellowish brown fine sand. The middle part, to a depth of about 46 inches, is very pale brown fine sand. The lower part to a depth of about 80 inches is white, mottled fine sand. In some areas, the surface layer is more than 9 inches thick. In places, the lower part of the underlying material is brown or dark brown. In some of the lower parts of the landscape, the soil is somewhat poorly drained.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Candler, Millhopper, and Myakka soils in small areas. Candler soils are excessively drained and are in higher-lying or more sloping upland areas than Tavares soil. Millhopper soils have a subsoil and are in similar positions on the landscape as Tavares soil. Myakka soils are poorly drained and are in lower-lying areas on the flatwoods than Tavares soils.

In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal high water table at a depth of 40 to 80 inches for more than 6 months. The high water table recedes to a depth of more than 80 inches during prolonged dry periods. The permeability of Tavares soil is rapid. The available water capacity is very low.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Tavares soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries or is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are instability of cutbanks and possible contamination of ground water. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate to high, a community sewage system can help to prevent contamination of water supplies by seepage. Plans for homesite development should provide for the preservation of as many trees as possible. Droughtiness, a result of the very low available water capacity, is a limitation, especially during extended dry periods. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, or to a woodland group, or to a range site.

56—Urban land. This map unit consists of miscellaneous areas that are covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that identification is not feasible. The slope is dominantly less than 2 percent, but it ranges from less than 2 percent to 5 percent.

In areas mapped as Urban land, 85 percent or more of the surface is covered by streets, parking lots, buildings, and other structures. In moderately built-up areas, these structures cover 50 to 85 percent of the surface.

Most areas of Urban land are artificially drained by sewer systems, gutters, tile drains, and surface ditches.

Present land use precludes the use of this miscellaneous area for cultivated crops, pasture, or commercial trees. Open areas generally are used for lawns, parks, playgrounds, cemeteries, or open spaces.

Urban land has not been assigned to a capability subclass, to a woodland group, or to a range site.

57—Wabasso fine sand. This soil is nearly level and poorly drained. It is on plains on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Wabasso fine sand, the Wabasso soil and similar soils make up 85 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 15 percent of the mapped areas.

Typically, the soil has a surface layer of very dark gray fine sand about 7 inches thick. The subsurface layer, to a depth of about 29 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 32 inches, is black fine sand. The next layer, to a depth of about 38 inches, is dark brown fine sand. The next layer, to a depth of about 46 inches, is light gray sandy clay loam. The lower part, to a depth of about 60 inches, is light greenish gray, mottled sandy clay loam. The substratum

to a depth of about 80 inches is gray loamy sand. Similar soils included in mapping, in some areas, have a subsoil at a depth of more than 30 inches. Other similar soils, in some places, have a subsoil at a depth of more than 40 inches, or have a very strongly acid subsoil, or have both. Other similar soils, in some areas, have a subsoil that is brown or dark yellowish brown; and in some places, the similar soils have thin discontinuous strata of limestone fragments in the underlying material.

Dissimilar soils included in mapping are Myakka and Pinellas soils in small areas. Myakka soils do not have a loamy subsoil below the sandy subsoil. Pinellas soils have a calcareous layer above the subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for 2 months and recedes to a depth of 40 inches during prolonged dry periods. Permeability is rapid in the surface and subsurface layers. It is moderate in the upper part of the subsoil and slow in the lower part, and it is rapid in the substratum. The available water capacity is low or moderate.

In most areas, this Wabasso soil is used as native pasture. In a few areas, it is used for cultivated crops, improved pasture, citrus crops, or homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes lopsided indiangrass, gallberry, saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops and pasture. If drained, this soil is moderately suited to citrus crops in areas that are relatively free of freezing temperatures. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will remove excess surface water and will help lower the water table. Droughtiness, a result of the low to moderate available water capacity, is a management concern, especially during extended dry periods. This soil is suited to most irrigation systems. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve crop production.

If a water control system is established and maintained, this soil is well suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderately high. Equipment use limitations and seedling mortality are the main limitations. Equipment use limitations are a concern if the soil is not properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. Bedding of rows helps to minimize the excessive wetness limitations.

If this soil is used for building site development, the main management concerns are excessive wetness and slow permeability of the lower subsoil. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. The slow permeability of the lower subsoil and the high water table increase the possibility that the septic tank absorption fields will not function properly. The slow permeability limitation can be minimized by increasing the size of the absorption field.

This Wabasso soil is in capability subclass IIIw, in woodland group 10W, and in the South Florida Flatwoods range site.

58—Wabasso-Urban land complex. This complex consists of Wabasso soil that is nearly level and poorly drained and of areas of Urban land. This complex is on broad plains on the flatwoods. The slope is 0 to 2 percent.

This map unit consists of 50 to 65 percent Wabasso soil and 30 to 45 percent Urban land. The included soils make up 15 percent or less of this map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the scale used for the maps in the back of this publication.

Typically, the surface layer of Wabasso soil is very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 21 inches, is light brownish gray fine sand. The upper part of the subsoil, to a depth of about 31 inches, is black fine sand. The middle part, to a depth of about 37 inches, is gray, mottled sandy clay loam. The lower part, to a depth of about 48 inches, is brown, mottled sandy clay loam. The substratum to a depth of about 80 inches is light gray, mottled loamy fine sand. In places, the upper part of the subsoil is at a depth of more than 30 inches. In places, the lower part of the subsoil is at a depth of more than 40 inches. In some areas, the upper part of the subsoil is brown or dark yellowish brown.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

Included in mapping are Felda, Malabar, and Myakka soils in small areas. Felda and Malabar soils do not have a dark color sandy subsoil above a loamy subsoil. Myakka soils do not have a loamy subsoil below a dark color sandy subsoil. These soils are in similar positions on the flatwoods as Wabasso soil.

In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal

high water table that fluctuates from the soil surface to a depth of about 10 inches for 2 months. The high water table recedes to a depth of 40 inches during prolonged dry periods. The permeability of the Wabasso soil is rapid in the surface and subsurface layers. It is moderate in the upper part of the subsoil and slow in the lower part, and it is rapid in the substratum. The available water capacity is low or moderate.

Present land use precludes the use of the soils in this map unit for cultivated crops, pasture, or commercial trees. Wabasso soil in the Urban land part of this complex is used for lawns, parks, playgrounds, or cemeteries or is left as open space.

If the soils in this map unit are used for building site development, the main management concerns are excessive wetness and slow permeability in the lower part of the subsoil. In most areas, the soils in this map unit are artificially drained. Drainage is needed to lower the water table, and fill material is needed in undrained areas for building site development. The slow permeability limitation in the lower part of the subsoil can be minimized by increasing the size of the absorption field. Selection of vegetation that is adapted to these soils is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The soils need to be mulched, fertilized, and irrigated to establish lawn grasses and other small seeded plants.

The soils in this map unit have not been assigned to a capability subclass, to a woodland group, or to a range site.

59—Winder fine sand. This soil is nearly level and poorly drained. It is on broad, low-lying sloughs on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Winder fine sand, the Winder soil and similar soils make up 88 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 12 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 10 inches, is grayish brown fine sand. The upper part of the subsoil, to a depth of about 14 inches, is dark grayish brown, mottled sandy loam and gray fine sand. The lower part of the subsoil, to a depth of about 30 inches, is gray sandy clay loam. The upper part of the substratum, to a depth of about 58 inches, is light gray, mottled sandy clay loam. The lower part to a depth of about 80 inches is gray sandy loam. Similar soils included in mapping, in some areas, have a subsoil at a depth of more than 20 inches. Other similar soils, in some areas, have a thin, discontinuous strata of fragmented limestone in the upper part of the subsoil.

Dissimilar soils included in mapping are Basinger, Myakka, and Wabasso soils in small areas. Basinger soils are very poorly drained. Myakka soils have a dark color sandy subsoil. Wabasso soils have a dark color sandy subsoil above a loamy subsoil.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 2 to 6 months. Permeability is rapid in the surface and subsurface layers. It is slow or very slow in the subsoil and in the substratum. The available water capacity is moderate.

In most areas, this Winder soil is used as pasture. In a few areas, it is used for cultivated crops or for homesite or urban development. The natural vegetation consists of live oak, cabbage palm, and slash pine. The understory includes saw palmetto, pineland threeawn, and waxmyrtle.

If a water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops. If suitable outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve crop production.

This soil is suited to pasture. Wetness limits the choice of plants that can be grown and restricts grazing during periods of excessive wetness. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition.

The potential of this soil for the production of slash pines is high. This soil has few limitations for woodland use and management. Equipment use limitations are a concern if the soil is not properly drained. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods.

If this soil is used for building site development, the main management concerns are excessive wetness and slow to very slow permeability of the subsoil and substratum. Population growth has resulted in increased construction of homes on this soil. The slow or very slow permeability of the subsoil and substratum and the high water table increase the possibility that the septic tank absorption fields will not function properly. The slow or very slow permeability limitation can be minimized by increasing the size of the absorption field. Drainage is needed to lower the high water table, and fill material is needed in most areas.

This Winder soil is in capability subclass IIIw, in woodland group 11W, and in the Cabbage Palm Hammocks range site.

60—Winder fine sand, frequently flooded. This soil is nearly level and poorly drained. It is on the flood plains. This soil is flooded for very long periods following prolonged intense rain. Many areas are isolated by stream channels and steep escarpments. The slope is 0 to 2 percent.

In 80 percent of the areas mapped as Winder fine sand, frequently flooded, the Winder soil and similar soils make up 76 to 99 percent of the mapped areas.

Dissimilar soils make up 1 to 24 percent of the mapped areas.

Typically, this soil has a surface layer of black fine sand about 5 inches thick. The subsurface layer, to a depth of about 14 inches, is grayish brown fine sand. The upper part of the subsoil, to a depth of about 18 inches, is gray sandy clay loam and white fine sand. The lower part of the subsoil, to a depth of about 34 inches, is grayish brown, mottled sandy clay loam. The substratum, to a depth of about 80 inches, is light brownish gray fine sand. Similar soils included in mapping, in some areas, have a subsoil at a depth of more than 20 inches. Other similar soils, in some areas, have a surface layer that is more than 8 inches thick or is stratified, or both. In some places are similar soils that have a thin, discontinuous strata of fragmented limestone in the upper part of the subsoil.

Dissimilar soils included in mapping are Samsula, Basinger, and Chobee soils in small areas. These soils are very poorly drained.

In most years, a seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 2 to 6 months. Permeability is rapid in the surface and subsurface layers, slow or very slow in the subsoil, and rapid in the substratum. The available water capacity is moderate.

In most areas, this Winder soil has been left idle in natural vegetation. In a few areas, it is used as pasture. The natural vegetation consists of Coastal Plain willow, red maple, cabbage palm, and sweetgum. The understory includes buttonbush, maidencane, sawgrass, smartweed, and sedges.

In its natural state, this soil is generally not suited to cultivated crops or pasture. If a water control system, such as dikes, ditches, and pumps, is established and maintained, this soil is suited to pasture and cultivated crops.

This soil is generally not suited to the production of pines because of flooding or extended wetness. It may be suited to the production of cypress and hardwoods through natural regeneration.

If this soil is used for building site development or for onsite waste disposal, flooding is the main hazard. Major flood control structures and extensive local drainage systems are needed to control flooding.

This Winder soil is in capability subclass Vw and in woodland group 11W. This soil has not been assigned to a range site.

61—Zolfo fine sand. This soil is nearly level and somewhat poorly drained. It is on broad, low ridges on the flatwoods. The slope is 0 to 2 percent.

In 95 percent of the areas mapped as Zolfo fine sand, the Zolfo soil and similar soils make up 88 to 99 percent of the mapped areas. Dissimilar soils make up 1 to 12 percent of the mapped areas.

Typically, this soil has a surface layer of very dark gray fine sand about 3 inches thick. The upper part of the subsurface layer, to a depth of about 15 inches, is grayish brown, mottled fine sand. The middle part, to a depth of about 51 inches, is light gray, mottled fine sand. The lower part, to a depth of about 60 inches, is grayish brown fine sand. The subsoil to a depth of about 80 inches is dark brown fine sand. Similar soils included in mapping, in some places, have a subsoil that extends to a depth of more than 80 inches. Other similar soils, in some of the higher parts of the landscape, are moderately well drained.

Dissimilar soils included in mapping are Malabar, Millhopper, Myakka, and Smyrna soils in small areas. Malabar, Myakka, and Smyrna soils are poorly drained. Millhopper soils are moderately well drained.

In most years, a seasonal high water table is at a depth of 24 to 40 inches for more than 2 to 6 months and recedes to a depth of 60 inches during prolonged dry periods. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low.

In most areas, this Zolfo soil is used for citrus crops or pasture or for homesite or urban development. In a few areas, it is used for cultivated crops or is left in natural vegetation. The natural vegetation consists of live oak, turkey oak, longleaf pine, and slash pine. The understory includes broomsedge, bluestem, lopsided indiangrass, saw palmetto, and pineland threeawn.

If a water control system is established and maintained and soil-improving measures applied, this soil is well suited to most cultivated crops. If drained, this soil is moderately suited to citrus crops in areas that are relatively free of freezing temperatures. Proper arrangement and bedding of tree rows, lateral ditches or tile drains, and well constructed outlets will help lower the water table. Droughtiness, a result of the low available water capacity, is a management concern, especially during extended dry periods. A well designed and properly managed irrigation system will help to maintain optimum soil moisture and thus ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime are generally needed to improve crop production.

This soil is moderately well suited to pasture. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential of this soil for the production of slash pines is moderately high. This soil has few limitations for woodland use and management.

If this soil is used for building site development, the main management concerns are excessive wetness, instability of cutbanks, and possible contamination of the

ground water. Population growth has resulted in increased construction of houses on this soil. Drainage is needed to lower the high water table, and fill material is needed in most areas. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields need to be mounded in most areas. If the density of housing is moderate to high, a community sewage system can help prevent contamination of water supplies by seepage.

This Zolfo soil is in capability subclass IIIw, in woodland group 10W, and in the Upland Hardwood Hammocks range site.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the suitability potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes. It can also be a very useful guide and be beneficial when selecting sites for houses, buildings, streets and roads, playgrounds, pond reservoir areas, and other uses.

Crops and Pasture

William G. Saalman and John F. Creighton, soil conservationists, Soil Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

The soils in Hillsborough County do not meet the requirements for prime farmland.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Large areas of agricultural land are in production in Hillsborough County. In 1982, farm product sales exceeded 230 million dollars. Hillsborough County ranked fifth in the State in value of farm products sold. Crops include citrus crops, vegetables, strawberries, field and container grown nursery plants, cut flowers, and hay. Livestock production ranges from dairy and beef cattle to tropical fish farming.

Pressures on local farmland acreage come from crop damage from freezes, high land values, low product prices, and more intensive competing land uses. Farmland acreage is expected to decline in the future. Many farming operations will continue on a sound and profitable basis.

Urbanization is increasing in Hillsborough County. The city of Tampa is expanding. In some cases, the outer edge of the city has joined with suburban areas, such as Temple Terrace. Former rural areas, such as Carrollwood and Citrus Park in northwest Hillsborough County, are becoming urbanized. Other urban centers not contiguous to Tampa, such as Brandon, Plant City, and Sun City, are growing. During the past few years, the county has consistently placed as one of the top ten growth areas in the country. Urbanization pressures will continue and land devoted to agriculture will continue to decline.

Soil Erosion

Soil erosion is the loss of soil by forces of water and wind. The erosion of soil from agricultural land causes loss of natural fertility and applied fertilizer elements. The available water capacity of a soil is reduced as topsoil erodes. When eroded soil moves from a field, fertilizer and pesticide residues are carried into waterways, causing pollution. Soil particles are considered pollutants to streams and waterways. Eroded soil, silt, or sediment,

can fill up drainage ditches, storm sewers, and other bodies of water. Eroded soil can worsen weed problems in ditches and waterways.

All forms of water and wind erosion occur in Hillsborough County. Soil erosion is a limited problem scattered throughout the county. Erosion is on urban land and agricultural land.

Erosion by water may be barely noticeable, as in sheet and rill erosion, where a thin layer of soil is removed from the field. Channel and gully erosion is more visible as large amounts of water collect and gather enough force to visibly scar a field. Channels and gullies become larger if left untreated.

Wind erosion or soil blowing occurs on soils that are not protected by cover crops, rye windbreaks, or plastic mulch. Soil particles, blown by the wind, sandblast tender crops. Windblown soil can aggravate respiratory ailments in people, increase maintenance on many types of machinery, and spread weeds and certain crop diseases. Soil erosion by wind in Hillsborough County occurs during dry, windy fall and spring days when vegetable crops are being established and large soil areas are left bare.

Factors affecting soil erosion are texture of the soil, type and amount of vegetation, slope, slope length, amount of soil surface unprotected by windbreaks, wind velocity, and type of farming activity.

Soil erosion occurs on unprotected cropland during fallow periods. Cover crops are especially important in reducing soil erosion on cropland during fallow periods. Ryegrass, various millets, sudangrass, and sesbania are excellent choices for cover crops in Hillsborough County. Sheet erosion in Hillsborough County occurs at tolerable rates as calculated by the Universal Soil Loss Equation. Improperly designed, installed, and maintained field drainage systems are the principal causes of soil erosion by water on cropland in Hillsborough County.

Citrus crops are often grown on moderately sloping land, which increases soil erosion. Many of the citrus soils in Hillsborough County are well drained and have a rapid infiltration rate. Storm-water runoff is therefore reduced. Soil erosion will occur on well drained and rapidly permeable soils if the groves are clean tilled. Planting vegetation between the rows of citrus and using specially designed and maintained surface drainage systems solve most erosion problems in citrus groves. Herbicides are used for weed control under the tree canopy. Newly planted citrus can be damaged by windblown sand. Rapid establishment of vegetation between the rows reduces this problem.

Erosion on pastureland is not a problem if a healthy grass cover is present. Erosion occurs on pasture if poor management practices that reduce the grass cover have been followed. Overstocking, overgrazing, and insufficient application of lime and fertilizer aggravate erosion on pastureland.

Urban expansion is progressing rapidly in Hillsborough County. Water and wind erosion occur on unprotected construction sites that have been stripped of vegetation. Sediment control practices are needed on construction sites.

Vegetables

The two major vegetable-growing areas in Hillsborough County are the Ruskin-Wimauma area in the southwest and the Dover-Plant City area in the east. The Ruskin-Wimauma area produces a large amount of tomatoes and one-quarter of the county's strawberries. Other vegetables, such as greens, green beans, okra, eggplant, peppers, cherry tomatoes, squash, cucumbers, watermelons, cantaloupes, and cauliflower, are grown in lesser amounts. The major crop in the Dover-Plant City area is strawberries. Many other vegetables are also grown in this area. Strawberries are planted in October and are harvested throughout the winter and spring.

Vegetable crops have a high demand for water and plant nutrients. Most of the vegetable crops in the county are grown on soils that have a sandy texture, low nutrient and available water capacity, and medium to strongly acid soil reaction. Limitations to use of these soils for vegetable crops can be minimized by management practices, such as irrigation, fertilization and liming, bedding, use of plastic mulch, and soil fumigation. The management practices are applied with such intensity that the soil's main function is a support and rooting medium.

All commercial tomato and strawberry operations are irrigated. Tomatoes and other winter vegetables and sod are irrigated by using a semiclosed seepage irrigation system. Strawberries, field- and container-grown nursery plants, and other vegetables are irrigated by solid set sprinkler systems.

Tender, high-value vegetable crops require large amounts of water at certain times of the year. Water conservation is a main management concern as water quality and quantity are reduced because of the increased salinity, the overdrawn aquifer, and the reduced recharge areas. In addition to providing the crop's water requirements, solid set sprinkler irrigation systems must be designed to provide freeze protection in strawberry fields and nurseries.

Tailwater recovery systems, or ponds that collect runoff water from fields, provide extra water for periods of peak demand, such as for freeze protection and at planting time. Use of these ponds in suitable locations are encouraged by the Soil Conservation Service.

Some vegetable farmers have begun planting forage sorghums during fallow periods to pick up the residual fertilizer from the vegetable crops and prevent salt build-up in the soil.

Double cropping of vegetables is being practiced on a limited basis and is gaining popularity. Tomato and

strawberry fields are bedded. Beds are covered with plastic mulch to accelerate and streamline storm runoff. Storm water should be controlled and carefully removed from the field to well maintained and vegetated outlets. Plastic does reduce soil erosion during the growing season.

Growers prefer to plant rows in a north-south direction. A north-south row orientation has a positive influence on fruit and vegetable production because of more uniform sunlight for the plant.

In 1982, about 6,130 acres was planted to tomatoes in the county, and 4,500 acres was planted to strawberries. In addition, over 1,000 acres each of snap beans, green peppers, and squash was grown. Other minor crops grown include cabbage, cauliflower, cucumbers, eggplant, field peas, greens, okra, and watermelons.

Vegetables in Hillsborough County are grown on a wide variety of soils. Most of these soils are poorly drained, such as Myakka, Smyrna, Seffner, Ona, Wabasso, and Pinellas soils. Tomatoes are grown extensively on Wabasso soils, and strawberries are widely grown on Seffner soils. Some vegetables are grown on soils that are very poorly drained, such as St. Johns and Basinger soils. These soils need extra care and planning for effective water control before being used for vegetables. In some places in the county, vegetables are grown on the somewhat poorly drained Zolfo soils, the moderately well drained Pomello soils, and the well drained Fort Meade soils; however, these areas are not very extensive.

One soil characteristic deserving special mention is the spodic horizon occurring in Immokalee, Myakka, Ona, Pomello, Smyrna, St. Johns, and Wabasso soils. The spodic layer allows semiclosed irrigation to be practiced efficiently. An artificial water table can often be built on the spodic layer that is less permeable than the overlying horizons.

Citrus

Commercial acreages of citrus are grown in rural and suburban Hillsborough County. Citrus groves are coming under increasing pressure from land development. Much of the citrus land, particularly in the northern part of the county, is on moderately well drained soils, such as Tavares and Millhopper soils, and this land is desirable for commercial and residential development. In 1982, the commercial citrus acreage was 37,631 as reported by the Florida Crop and Livestock Reporting Service. Most of this acreage is harvested for processing into orange juice concentrate. Small acreages of citrus specialty fruits, such as tangerines and tangelos and navel and temple oranges, are also grown. Citrus acreage declined over the past 20 years and will decline further because of urbanization and recent freezes.

Citrus is grown on a wide variety of soils in Hillsborough County. Soils range from the excessively well drained Candler and Lake soils to the poorly drained Myakka and Smyrna soils. Supplemental irrigation is practiced on all of these soils during moisture stress periods in spring and fall. Low volume or trickle irrigation is widely practiced to conserve irrigation water. Soils are low in organic matter and plant nutrients. Fertilizer and lime are beneficial to the crop. Waste water treatment plant sludge is a useful soil amendment to add organic matter and nutrients and to improve tilth.

Water control practices are important for citrus crops. On poorly drained soils, such as Myakka and Smyrna soils, the seasonal high water table creates a shallow root zone. Citrus trees on poorly drained soils are generally planted on raised beds to increase the available root zone. Subsurface drainage systems, or tile drains, and surface drainage systems, or open ditches, are often installed in citrus groves to increase the rooting depth. Irrigation systems are also beneficial on poorly drained soils because the small volume of soil in the limited root zone needs frequent moisture replenishment.

Pastureland

R. Greg Hendricks, range conservationist, Soil Conservation Service, assisted in preparing this section.

Beef cattle and dairy operations occur throughout Hillsborough County. An estimated 2,000 producers and 100,000 head of cattle are in the county. Less than 150 producers have herds of 100 head or more. The largest number of producers have less than 20 head.

In 1982, Hillsborough County had 65 dairies with 10 or more milk cows. Milk is marketed through the local co-op in Tampa. Dairy cows feed on pasture, hay, and concentrates. Pasture and hay crops are generally produced on farms. Hay is also produced for local sale by nonlivestock producers in the county. In 1982, hay for beef and dairy cattle and horses was harvested from 11,000 acres.

At least one major feedlot is in Hillsborough County. Grain and supplements are brought in from outside the county. Feedlot forage is provided from sudan sorghum silage, which is grown onsite. Limited acreages of millet sorghum for silage to supplement hay and pasture are grown by dairies.

Approximately 120,000 acres of tame pasture is in the county. The most widely grown grass is bahiagrass. Other grasses used for tame pasture are improved bermudagrass, stargrass, limpograss, and pangolagrass. These tame pasture grasses are exotic to the United States and thus have not evolved in our relatively infertile sandy soils. Therefore, an annual fertility program is essential to achieve acceptable production levels of forage that are able to outperform competing weeds, such as dogfennel and broomsedge. Bahiagrass, unlike the other common pasture grasses, will maintain its stand under extremely low fertilization rates. Under low fertility rates, that is, less than 40 pounds of nitrogen per acre, bahiagrass can be expected to produce no

more than 3 animal-unit-months (AUM) per acre under most soil and water conditions. Another very important consideration to a pasture maintenance program is pH level. Soils that are suitable for the common tame pasture grasses are naturally acid with very low pH levels. For tame pasture plants to thrive and efficiently utilize fertilizer, the pH level must be maintained in the 5.5 to 6.5 range. To maintain proper pH range, limestone should be applied about every 3 years, or as needed, according to soil tests.

Following adequate pastureland establishment procedures is vital if a good stand of forage is to be produced in a reasonable period of time. Proper seeding rates for bahiagrass and adequate quantity and quality of vegetative planting materials must be applied for pangolagrass, limpograss, bermudagrass, and stargrass. Well prepared seedbed, good soil moisture, rolling or packing for good soil contact, and timely rains are critical factors.

These warm-season, perennial tame pasture grasses mentioned above produce forage between March and October. During the cooler months, November to February, warm-season grasses are dormant, and forage quality is extremely low. Incorporating cool-season forages, such as rye, ryegrass, and clover, has been done in the past. The winter months in Hillsborough County are generally very dry. Therefore, irrigation is essential if cool-season forages are to be produced with any reliability. The cost of irrigating these pastures and the high cost of establishment and maintenance has led to a decline over the last 20 years of these cool-season pastures.

Landspreading of treated sewage effluent on tame pasture is gaining interest. Tame pasture is also used for landspreading effluent from animal waste management systems. Waste water treatment plant sludge is also applied to tame pasture on a limited basis. Sod production is often practiced in conjunction with tame pasture grazing. Bahiagrass is the principal pasture or sod production grass. St. Augustine grass is a premium sod grass and is not used for grazing in the Hillsborough County area.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 4. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 4 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *w* or *s*, to the class numeral, for example, IIIw. The letter *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage), and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w* or *s*.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland and Grazeable Woodland

R. Greg Hendricks, range conservationist, Soil Conservation Service, assisted in preparing this section.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship of the soils, vegetation, and water.

Table 5 shows, for each soil, the range site; the total annual production of vegetation in favorable, average, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in table 5 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, or proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Potential annual production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential climax plant community. Total production includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants, but it does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, average, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In an average year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Range management requires a knowledge of the kinds of soil and of the potential climax plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential climax plant community on a particular range site. The more closely the existing community resembles the potential climax community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential climax plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Native grasses are an important part of the overall, year-round supply of forage to livestock producers in Hillsborough County. This forage is readily available. It is economical and provides important roughage needed by cattle, which is the principal grazing livestock produced in the area. About 314,000 acres throughout the county is available as native rangeland to cattle producers. Of this, 180,000 acres is used strictly as rangelands. The remaining 134,000 acres is used by cattle producers in connection with pulp and timber operations as grazeable woodlands.

Rangelands

Rangelands consist of specific native vegetative composition makeup, which differ because of soil properties, light intensity, and ground water fluctuation. These recognizable differences in plant composition on rangelands in Hillsborough County are defined by specific range sites. The dominant native forage plants that grow on a range site are generally the most productive and the most suitable for livestock. These dominant native forage plants will maintain themselves as long as the environment does not change.

The native forage plants are grouped into three categories according to their response to grazing—decreasers, increasers, and invaders:

Decreasers are generally the most abundant and most palatable plants on a given range site in good and excellent condition, and they decrease in abundance if the rangeland is under continuous heavy grazing.

Increasers are plants less palatable to livestock, and they increase for a short time under continuous heavy grazing but eventually decrease under continuous heavy grazing.

Invaders are native to rangelands in small amounts. They have very little forage value, and they tend to increase and become the new dominant plants as the decreaser and increaser plants have been grazed out.

Range condition is determined by comparing the present plant community with the potential climax plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only, and it does not have specific meaning that pertains to the present plant community in a given use. Four condition classes are used to measure range condition. These are:

- Excellent condition—producing 76 to 100 percent of the potential
- Good condition—producing 51 to 75 percent of the potential
- Fair condition—producing 26 to 50 percent of the potential
- Poor condition—producing 0 to 25 percent of the potential

About 15 percent of the rangelands in Hillsborough County is in good and excellent condition and about 85 percent is in poor and fair condition. For each soil in Hillsborough County that supports rangeland vegetation suitable for grazing, table 5 gives the range site that can be expected if the native vegetative cover has not been eliminated by cultivation or by other influences of man. Table 5 also shows, for each range site in excellent condition, the annual production of air-dry herbage per acre that can be expected in favorable, average, and unfavorable years. Favorable years are those in which climatic factors, such as rainfall and temperature, are favorable for plant growth. Moisture content in the plants varies as the growing season progresses and is not a measure of productivity. Forage refers to total vegetation produced annually on well managed rangeland and does not reflect forage value or grazing potentials.

Management of the soils for range should be planned with potential productivity in mind. Soils with the highest production should be given highest priority when economic considerations are important.

Major management considerations revolve around livestock grazing. The objective in range management is to control grazing so that the native plants growing on a site are about the same in kind and amount as the potential climax plant community for that site. Such management generally results in the optimum production of vegetation, conservation of water, and controlled erosion. The length of time an area should be grazed, the season it should be used, how long and when the range should be rested, the grazing pattern of livestock within a pasture that contains more than one soil, and the palatability of the dominant plants on the soil are basic considerations if rangelands are to be improved or maintained.

Rangeland improvement practices, such as mechanical brush control, controlled burning, and especially controlled livestock grazing, benefit rangelands. Predicting the effects of these practices is of utmost importance. Without exception, the proper management of range will result in sustained production and conservation of the soil and water resources with improvement of the habitat for many wildlife species.

Grazeable Woodland

Grazeable woodland is forest that has an understory of native grasses, legumes, and forbs. The understory is an integral part of the forest plant community. The native plants can be grazed without significantly impairing other forest values. On such forest land, grazing is compatible with timber management if it is controlled or managed in such a manner that timber and forage resources are maintained or enhanced.

Understory vegetation consists of grasses, forbs, shrubs, and other plants within the reach of livestock or used by grazing or browsing wildlife. A well managed forest can produce enough understory vegetation to support an optimum number of livestock or wildlife, or both.

Forage production of grazeable woodland varies according to the different kinds of grazeable woodland. The potential carrying capacity is affected by the amount of shade cast by the canopy; the accumulation of fallen needles; the influences of time and intensity of grazing on the forage; the number, size, and spacing of trees; and the method of site preparation.

Woodland Management and Productivity

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity

influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone are major influences of tree growth. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than others, and some are more susceptible to erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. The common forest understory plants are also listed. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

Table 6 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *S* indicates a dry, sandy soil. The letter *A* indicates a soil that has no significant restrictions or limitations for forest use and management. If a soil has more than one limitation, the priority is as follows: W and S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot operate; more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if slopes are steep enough that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features. *Seedling mortality* is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth and duration of the water table, rooting depth, and the aspect of the slope. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing surface drainage, or providing artificial shade for seedings. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

Ratings of *windthrow hazard* consider the likelihood of trees being uprooted by the wind. Restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table, fragipan, or bedrock, or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them and *moderate* if strong winds cause an occasional tree to be blown over and many trees to break. Ratings of *moderate* indicate the need for care in thinning or possibly not thinning. Specialized equipment may be needed to avoid damage to shallow root systems in partial cutting operations. A plan for periodic salvage of windthrow trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. *Plant competition* becomes more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants reduces adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from

undesirable plants reduces natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The soils that are commonly used to produce timber have the yield predicted in cubic meters. The yield is predicted at the point where mean annual increment culminates.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The procedure and technique for determining site index are given in the site index tables used for the Soil Survey of Hillsborough County *(3, 10, 12, 15, 17)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. Cubic feet can be converted to cords per acre by dividing by 85. It can be converted to board feet by multiplying by a factor of about 71. For example, a productivity class of 8 means the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 568 board feet per acre per year.

Trees to plant are those that are used for reforestation or, if suitable conditions exist, natural regeneration. They are suited to the soils and will produce a commercial wood crop. Desired product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees to use for reforestation.

Recreation

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that one or more of the soil properties are considered somewhat restrictive for the intended use. If need be, these properties can be modified or overcome by special planning or design. *Severe* means that soil properties are unfavorable for the intended use and should be corrected by special design, soil reclamation, or planned maintenance before the site can be adapted to the intended use.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry. Strong slopes can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry. If grading is needed, the depth of the soil over bedrock should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are well drained, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to

prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John F. Vance, biologist, Soil Conservation Service, helped to prepare this section.

Wildlife is a valuable resource of Hillsborough County, but this resource has been severely impacted by urban development, especially in the Tampa, Brandon, Plant City, and Sun City areas. This resource also has been severely impacted by intensive agricultural development in the Dover-Plant City and the Ruskin-Wimauma areas. Less developed areas still support a large variety and number of wildlife.

The game species include white-tailed deer, squirrel, turkey, feral hogs, bobwhite quail, and waterfowl. Nongame species include raccoon, rabbit, armadillo, opossum, skunk, bobcat, gray and red foxes, otter, and a variety of songbirds, wading birds, shore birds, woodpeckers, reptiles, and amphibians.

Good habitat for wildlife is available in the 3,000 acre Hillsborough River State Park and in other smaller parks administered by the county.

The Hillsborough River, the upper Alafia and Little Manatee Rivers, and the lakes and ponds in the less urbanized areas of the county provide good freshwater fishing. The main species include largemouth bass, bluegill, redear, spotted sunfish, warmouth, black crappie (speckled perch), chain pickerel, and catfish.

Tampa Bay, the tidal creeks, and other areas adjacent to the Gulf of Mexico provide good saltwater fishing. The main species include spotted seatrout, red drum, and spot.

Many endangered or threatened species are in Hillsborough County. They range from the rare red-cockaded woodpecker and indigo snake to more commonly known species, such as the alligator and bald eagle. A complete list of such species, with detailed information on range and habitat, can be obtained at the local office of the Soil Conservation Service.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, browntop millet, and grain sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, lovegrass, Florida beggarweed, clover, and sesbania.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, and bristlegrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, saw palmetto, cherry, sweetgum, cabbage palm, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are firethorn, wild plum, and waxmyrtle.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cypress, cedar, and juniper.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, and slope. Examples of wetland plants are smartweed, wild millet, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, mink, and otter.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

State and local ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to: evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are considered

somewhat restrictive for the intended use but can be modified or overcome by special planning or design; and *severe* if soil properties or site features are unfavorable for the intended use and should be corrected by special design, soil reclamation, or planned maintenance before the site can be adapted to the intended use. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, depth to a high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not considered somewhat restrictive for the intended use but can be modified or overcome by special planning or design; and *severe* if soil properties or site features are unfavorable for the intended use and should be corrected by special design, soil reclamation, or planned maintenance before the site can be adapted to the intended use.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Bedrock interferes with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is

required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 foot or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 foot to 3 feet. Soils rated *poor* are wet, and the depth to the water table is less than 1 foot. They may have a plasticity index of more than 10 or a high shrink-swell potential. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is

evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as marl, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have too much humus, or contain a large amount of soluble salts, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are considered somewhat restrictive for the intended use but can be modified or overcome by special planning or design; and *severe* if soil properties or site features are unfavorable for the intended use and should be corrected by special design, soil reclamation, or planned maintenance before the site can be adapted to the intended use.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and the salinity of the soil. Depth to bedrock affects the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, slope,

and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by depth to bedrock. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area, or from nearby areas, and on field examination.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the

more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

In table 15, some soils are assigned to two hydrologic soil groups. Soils that have a seasonal high water table but can be drained are assigned first to a hydrologic soil group that denotes the drained condition of the soil and then to a hydrologic group that denotes the undrained condition, for example, B/D. Because there are different degrees of drainage and water table control, onsite investigation is needed to determine the hydrologic group of the soil in a particular location.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *Common* is used when classification as occasional or frequent does not affect interpretations. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. June-February, for example, means that flooding can occur during the period June through February. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table-Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 15 shows the expected initial subsidence and total subsidence, which is initial subsidence plus the slow sinking that occurs over a period of several years as a result of oxidation.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(16)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Spodosol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquods (*Aqu*, meaning water, plus *ods*, from Spodosol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquods (*Hapl*, meaning minimal horizonation, plus *aquods*, the suborder of the Spodosols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquods.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is sandy, siliceous, hyperthermic, Typic Haplaquods.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. An example is the St. Johns series, which is a member of the sandy, siliceous, hyperthermic family of Typic Haplaquods.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (13)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (16)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Adamsville Series

The Adamsville series consists of deep, somewhat poorly drained soils. These soils formed in sandy marine sediment. They are on broad ridges on the flatwoods. A seasonal high water table is at a depth of 20 to 40 inches for 2 to 6 months. The slope is less than 2 percent. These soils are hyperthermic, uncoated, Aquic Quartzipsamments.

Adamsville soils are closely associated on the landscape with Lochloosa, Pomello, Tavares, and Zolfo

soils. Lochloosa soils have an argillic horizon. Pomello and Zolfo soils have a spodic horizon. Pomello and Tavares soils are moderately well drained.

Typical pedon of Adamsville fine sand; about 0.5 mile west of Welcome, 2,000 feet west and 100 feet south of the northeast corner of sec. 33, T. 30 S., R. 22 E.

A—0 to 6 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; friable; many fine, medium, and coarse roots; mixed organic matter and sand grains having a salt-and-pepper appearance; medium acid; clear smooth boundary.

C1—6 to 30 inches; brown (10YR 5/3) fine sand; single grained; loose; common fine, medium, and coarse roots; medium acid; gradual wavy boundary.

C2—30 to 80 inches; pale brown (10YR 6/3) fine sand; common medium distinct yellowish brown (10YR 5/8) mottles; single grained; slightly acid.

Reaction ranges from very strongly acid to mildly alkaline throughout. Silt and clay make up less than 5 percent of the 10- to 40-inch control section.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The texture is fine sand or sand.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. The texture is fine sand or sand.

Archbold Series

The Archbold series consists of deep, moderately well drained soils. These soils formed in sandy marine sediment. They are on low ridges on the flatwoods. In most years, a seasonal high water table is at a depth of 42 to 60 inches for about 6 months. The slope is less than 2 percent. These soils are hyperthermic, uncoated Typic Quartzipsamments.

Archbold soils are closely associated on the landscape with Pomello soils. Pomello soils have a spodic horizon.

Typical pedon of Archbold fine sand; about 1 mile northeast of Turkey Creek, 800 feet north and 100 feet east of the southwest corner of sec. 1, T. 29 S., R. 21 E.

A—0 to 2 inches; light gray (10YR 6/1) fine sand; single grained; loose; many fine and medium roots; strongly acid; diffuse boundary.

C—2 to 80 inches; white (10YR 8/1) fine sand; single grained; loose; few fine and medium roots; strongly acid.

Reaction ranges from extremely acid to strongly acid throughout. Silt and clay make up less than 2 percent of the 10- to 40-inch control section.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2.

Basinger Series

The Basinger series consists of deep, very poorly drained soils. These soils formed in sandy marine sediment. They are in swamps and depressions and along drainageways on the flatwoods. A seasonal high water table is within 10 inches of the surface. The slope is less than 2 percent. These soils are siliceous, hyperthermic Spodic Psammaquents.

Basinger soils are closely associated on the landscape with Holopaw, Myakka, Ona, and Samsula soils. Holopaw soils have an argillic horizon. Samsula soils are organic. Myakka and Ona soils have a spodic horizon and are poorly drained.

Typical pedon of Basinger fine sand, in an area of Basinger, Holopaw and Samsula soils, depressional; about 1.5 miles north of Enon Church, about 200 feet east and 1,000 feet south of the northwest corner of sec. 13, T. 28 S., R. 22 E.

A—0 to 7 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

E—7 to 28 inches; gray (10YR 6/1) fine sand; single grained; loose; few fine and medium roots; very dark streaks along root channels; very strongly acid; clear wavy boundary.

Bh/E—28 to 42 inches; brown (10YR 5/3) and grayish brown (10YR 5/2) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

C—42 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid.

Reaction ranges from extremely acid to neutral throughout.

The A horizon has hue of 10YR, value of 2 to 6, and chroma of 1. Typically, the texture is fine sand, but the range includes muck or mucky fine sand.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 3.

The B part of the Bh/E horizon has hue of 5YR, value of 3, and chroma of 3 or 4; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 4 or 5, and chroma of 2. The E part has hue of 10YR, value of 5 to 8, and chroma of 1 to 3.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3.

Broward Series

The Broward series consists of moderately deep, somewhat poorly drained soils that formed in sandy marine sediment. These soils are underlain by limestone bedrock. They are on low-lying ridges along the coastal areas. In a natural state, the high water table is at a depth of 30 inches for 2 to 6 months during most years.

The slope is less than 2 percent. These soils are hyperthermic, uncoated Aquic Quartzipsamments.

Broward soils are closely associated on the landscape with Malabar and Wabasso soils. Malabar and Wabasso soils do not have limestone bedrock within 80 inches of the surface and are poorly drained.

Typical pedon of Broward fine sand, in an area of Broward-Urban land complex; about 1 mile south of Tampa International Airport, 500 feet north and 500 feet west of the southeast corner of sec. 17, T. 29 S., R. 18 E.

A—0 to 4 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; many medium and fine roots; mixed black organic matter and uncoated sand grains having a salt-and-pepper appearance; slightly acid; clear smooth boundary.

C1—4 to 10 inches; gray (10YR 5/1) fine sand; single grained; loose; few fine roots; neutral; gradual wavy boundary.

C2—10 to 14 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; neutral; gradual wavy boundary.

C3—14 to 26 inches; very pale brown (10YR 8/3) fine sand; few fine faint light gray streaks and few fine distinct yellow (10YR 8/6) mottles; single grained; loose; mildly alkaline; abrupt wavy boundary.

2R—26 inches; light gray (10YR 7/1) and white (10YR 8/1) limestone.

Depth to limestone ranges from 20 to 40 inches. In most areas, limestone is pitted by solution cavities to a depth of 60 inches or more. Reaction ranges from medium acid to moderately alkaline throughout.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture is sand or fine sand. Some pedons have thin, discontinuous layers of marl in the lower part of the C horizon.

Candler Series

The Candler series consists of deep, excessively drained soils. These soils formed in sandy marine sediment. They are on the uplands. The water table is at a depth of more than 80 inches. The slope ranges from 0 to 12 percent. These soils are hyperthermic, uncoated Typic Quartzipsamments.

Candler soils are closely associated on the landscape with Kendrick, Millhopper, and Tavares soils. Kendrick and Millhopper soils have an argillic horizon. Tavares soils are moderately well drained.

Typical pedon of Candler fine sand, 0 to 5 percent slopes; about 1.5 miles northeast of Sulphur Springs, 2,800 feet east and 300 feet north of the southwest corner of sec. 8, T. 28 S., R. 19 E.

A—0 to 6 inches; dark gray (10YR 4/1) fine sand; single grained; loose; few fine and medium roots; many uncoated sand grains; strongly acid; clear wavy boundary.

E1—6 to 35 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; few fine and medium roots; many uncoated sand grains; strongly acid; gradual wavy boundary.

E2—35 to 72 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; few fine roots; many uncoated sand grains; strongly acid; clear wavy boundary.

E&Bt—72 to 80 inches; very pale brown (10YR 7/3) fine sand, (E); strong brown (7.5YR 5/8) loamy sand lamellae about 1/16 to 1/4 inch thick and 2 to 6 inches long, (Bt); single grained; loose; few fine roots; many uncoated sand grains; strongly acid.

The thickness of the solum is 80 inches or more. Reaction ranges from very strongly acid to medium acid throughout.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8.

The E part of the E&Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 6; and the Bt part has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8. The lamellae is about 1/32 to 1/2 inch thick. It is 1/2 inch to about 40 inches in length.

Chobee Series

The Chobee series consists of deep, very poorly drained soils. These soils formed in loamy marine sediment. They are in depressions and on low-lying flats on the flatwoods and on the flood plains. A seasonal high water table is within 10 inches of the surface for more than 6 months during most years. The slope is less than 2 percent. These soils are fine-loamy, siliceous, hyperthermic Typic Argiaquolls.

Chobee soils are closely associated on the landscape with Floridana and Winder soils. Floridana soils have a surface and subsurface layer that is more than 20 inches thick. Winder soils are poorly drained, and they do not have a mollic epipedon.

Typical pedon of Chobee loamy fine sand; 1.5 miles south of Temple Terrace Junction, 2,300 feet west and 1,500 feet north of the southeast corner of sec. 30, T. 28 S., R. 20 E.

A—0 to 16 inches; black (10YR 2/1) loamy fine sand; moderate medium granular structure; friable; many fine and medium roots; few small pockets of gray (10YR 5/1) sand; slightly acid; clear smooth boundary.

Bt1—16 to 33 inches; dark gray (10YR 4/1) sandy clay loam; weak coarse subangular blocky structure; slightly sticky and slightly plastic; common fine and medium roots; mildly alkaline; gradual wavy boundary.

Bt2—33 to 49 inches; grayish brown (10YR 5/2) sandy clay loam; common fine distinct light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; sticky and plastic; few fine roots; many fine to coarse soft white carbonate nodules; calcareous; moderately alkaline; gradual wavy boundary.

Cg1—49 to 59 inches; light gray (10YR 7/1) loamy fine sand; few fine distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; massive; nonsticky and nonplastic; calcareous; moderately alkaline; gradual irregular boundary.

Cg2—59 to 80 inches; light gray (10YR 7/1) loamy fine sand; many fine to coarse dark grayish brown (10YR 4/2) mottles; massive; friable; about 35 to 45 percent, by volume, shell fragments; calcareous; moderately alkaline.

The thickness of the solum is more than 40 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Typically, the texture is muck or loamy fine sand, but the range includes fine sand, sandy loam, or mucky fine sand. Reaction ranges from strongly acid to neutral.

The upper part of the Bt horizon has hue of 10YR, value of 2 to 5, and chroma of 1. The lower part has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. The texture is sandy clay loam or fine sandy loam. Reaction ranges from medium acid to moderately alkaline in the Bt horizon.

The Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is loamy sand, loamy fine sand, fine sandy loam, or sandy loam. Reaction ranges from medium acid to moderately alkaline.

Eaton Series

The Eaton series consists of deep, poorly drained and very poorly drained soils. These soils formed in fine textured marine sediment. They are in depressions on the flatwoods. A seasonal high water table is within 10 inches of the surface for 1 to 4 months during most years. Depressional areas may be ponded during wet periods. The slope is less than 2 percent. These soils are clayey, mixed, hyperthermic Arenic Albaqualfs.

Eaton soils are closely associated on the landscape with Felda and Wabasso soils. Felda soils have a fine-loamy argillic horizon. Wabasso soils have a spodic horizon.

Typical pedon of Eaton fine sand; 0.5 mile east of Moriczville, 2,500 feet east and 750 feet north of the southwest corner of sec. 20, T. 27 S., R. 22 E.

A—0 to 5 inches; black (10YR 2/1) fine sand; moderate medium granular structure; friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.

E—5 to 22 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine and medium roots; very strongly acid; abrupt wavy boundary.

Btg1—22 to 28 inches; dark grayish brown (10YR 4/2) sandy clay; common fine prominent strong brown (7.5YR 5/6) and few fine prominent dark brown (7.5YR 3/2) mottles; weak fine subangular blocky structure; sticky and plastic; few fine roots; very strongly acid; clear wavy boundary.

Btg2—28 to 80 inches; light brownish gray (10YR 6/2) sandy clay; common fine distinct dark brown (7.5YR 3/4) mottles; weak medium subangular blocky structure; sticky and plastic; strongly acid.

The thickness of the solum is 60 inches or more.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. Typically, the texture is fine sand, but it ranges from fine sand to mucky fine sand. Reaction is very strongly acid or strongly acid.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is fine sand or loamy fine sand. Reaction is very strongly acid or strongly acid.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. Some pedons have a Cg horizon beneath the Btg horizon. Reaction ranges from very strongly acid to medium acid.

Felda Series

The Felda series consists of deep, poorly drained soils. These soils formed in stratified sandy and loamy alluvium and marine sediment. They are on flood plains and on the flatwoods. A seasonal high water table is within 10 inches of the surface for 2 to 6 months during most years. Depressions are often ponded during wet periods. The slope is less than 2 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

Felda soils are closely associated on the landscape with Basinger, Myakka, Pinellas, Wabasso, and Winder soils. Basinger soils are very poorly drained and do not have an argillic horizon. Myakka and Wabasso soils have a spodic horizon. Myakka soils do not have an argillic horizon. Pinellas soils are calcareous in the upper part of the subsoil. Winder soils have a surface and subsurface layer that is less than 20 inches thick.

Typical pedon of Felda fine sand; about 2 miles south of Temple Terrace Junction, 2,100 feet west and 1,000 feet south of the northeast corner of sec. 36, T. 28 S., R. 19 E.

A—0 to 5 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; friable; many fine and medium roots; mixed organic matter and sand grains

having a salt-and-pepper appearance; strongly acid; clear wavy boundary.

E1—5 to 18 inches; dark gray (10YR 4/1) fine sand; common medium distinct brown (10YR 4/3) mottles; single grained; loose; many fine roots; slightly acid; clear wavy boundary.

E2—18 to 22 inches; dark grayish brown (10YR 4/2) fine sand; common medium distinct dark yellowish brown (10YR 4/4) mottles; single grained; loose; few fine and medium roots; slightly acid; clear wavy boundary.

Btg—22 to 45 inches; light brownish gray (10YR 6/2) sandy clay loam; common coarse distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; slightly sticky and slightly plastic; few fine roots; neutral; clear irregular boundary.

Cg—45 to 80 inches; light gray (10YR 7/2) loamy sand; massive; nonsticky and nonplastic; many shell fragments; mildly alkaline.

The thickness of the solum ranges from 30 to 80 inches. Reaction ranges from strongly acid to mildly alkaline in the A horizon and from slightly acid to moderately alkaline in the E, Bt, and C horizons.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. The texture is sandy loam or sandy clay loam.

The Cg horizon has hue of 10YR to 5G, value of 4 to 7, and chroma of 1 or 2. The texture is loamy sand or fine sand. In some pedons, this horizon does not have shell fragments.

Floridana Series

The Floridana series consists of deep, very poorly drained soils. These soils formed in sandy and loamy marine sediment. They are in sloughs and swales on the flatwoods. A seasonal high water table is within 10 inches of the surface for more than 6 months during most years. Depressional areas are often ponded during wet periods. The slope is less than 2 percent. These soils are loamy, siliceous, hyperthermic Arenic Argiaquolls.

Floridana soils are closely associated on the landscape with Chobee, Felda, and Holopaw soils. Chobee soils do not have a subsurface layer. Felda and Holopaw soils do not have a mollic epipedon. Felda soils are poorly drained.

Typical pedon of Floridana fine sand; about 6 miles southeast of Fort Lonesome, 1,000 feet east and 2,500 feet south of the northwest corner of sec. 24, T. 32 S., R. 22 E.

A—0 to 12 inches; black (10YR 2/1) fine sand; weak medium granular structure; friable; common fine and few medium roots; organic matter coated sand grains; slightly acid; clear wavy boundary.

E—12 to 28 inches; gray (10YR 5/1) fine sand; single grained; loose; common medium roots; slightly acid; clear wavy boundary.

Btg1—28 to 43 inches; dark gray (10YR 4/1) sandy clay loam; common coarse distinct brown (10YR 5/3) mottles; moderate coarse subangular blocky structure; slightly sticky and slightly plastic; common fine and medium roots; mildly alkaline; clear wavy boundary.

Btg2—43 to 60 inches; gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; slightly sticky and slightly plastic; mildly alkaline; clear wavy boundary.

Btg3—60 to 80 inches; gray (10YR 5/1) sandy loam; common medium distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; slightly sticky and slightly plastic; common medium lenses of sand and loamy sand; mildly alkaline.

The thickness of the solum ranges from 48 to 80 inches. Reaction ranges from very strongly acid to moderately alkaline throughout.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The texture is fine sand or mucky fine sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. The texture is sandy clay loam, sandy loam, or fine sandy loam.

Some pedons have a C horizon that has hue of 5Y or 2.5Y, value of 5 to 8, and chroma of 1. The texture is loamy fine sand or sand.

Fort Meade Series

The Fort Meade series consists of deep, well drained soils. These soils formed in sandy marine sediment. They are on the uplands. A seasonal high water table is at a depth of more than 72 inches. The slope ranges from 0 to 5 percent. These soils are sandy, siliceous, hyperthermic Quartzipsammentic Haplumbrepts.

Fort Meade soils are closely associated on the landscape with Gainesville and Millhopper soils. Gainesville soils do not have an umbric epipedon. Millhopper soils have an argillic horizon.

Typical pedon of Fort Meade loamy fine sand, 0 to 5 percent slopes; about 2.5 miles southeast of Turkey Creek, 2,000 feet west and 2,650 feet south of the northeast corner of sec. 13, T. 29 S., R. 21 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) loamy fine sand; weak fine granular structure; friable; few fine and coarse roots; neutral; clear smooth boundary.

A—7 to 26 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; friable; few fine and coarse roots; neutral; clear wavy boundary.

C1—26 to 58 inches; yellowish brown (10YR 5/6) loamy sand; single grained; loose; few coarse roots; medium acid; gradual wavy boundary.

C2—58 to 72 inches; yellowish brown (10YR 5/8) loamy sand; single grained; loose; strongly acid; gradual wavy boundary.

C3—72 to 80 inches; light yellowish brown (10YR 6/4) loamy sand; single grained; loose; common medium yellowish brown (10YR 5/6) phosphatic pebbles; strongly acid.

The content of weathered phosphatic and iron pebbles range from 0 to 5 percent, by volume. These pebbles range from 4 to 20 millimeters in size. Reaction ranges from strongly acid to neutral in the A horizon and from very strongly acid to medium acid in the C horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3.

The C horizon has hue of 10YR, value of 4 or 6, and chroma of 3 to 8. The texture is loamy sand or loamy fine sand.

Gainesville Series

The Gainesville series consists of deep, well drained soils. These soils formed in sandy marine sediment. They are on the uplands. A seasonal high water table is at a depth of more than 72 inches. The slope ranges from 0 to 5 percent. These soils are hyperthermic, coated Typic Quartzipsamments.

Gainesville soils are closely associated on the landscape with Fort Meade and Tavares soils. Fort Meade soils have an umbric epipedon. Tavares soils have less than 5 percent silt and clay to a depth of 40 inches.

Typical pedon of Gainesville loamy fine sand, 0 to 5 percent slopes; about 10 miles northwest of Plant City, 500 feet east and 600 feet north of the southwest corner of sec. 5, T. 28 S., R. 22 E.

A—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy fine sand; moderate medium granular structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.

C1—9 to 38 inches; brown (10YR 4/3) loamy fine sand; weak medium granular structure; very friable; common fine and medium roots; many coated sand grains; strongly acid; clear wavy boundary.

C2—38 to 80 inches; strong brown (7.5YR 5/6) loamy fine sand; single grained; loose; many coated sand grains; few fine and medium weathered phosphatic pebbles; strongly acid.

The content of weathered phosphatic and iron pebbles ranges from 0 to 5 percent, by volume. These pebbles range from 4 to 20 millimeters in size. Reaction ranges from very strongly acid to slightly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. The texture is loamy sand or loamy fine sand.

Holopaw Series

The Holopaw series consists of deep, very poorly drained soils. These soils formed in sandy marine sediment. They are in swamps and depressions on the flatwoods. A seasonal high water table fluctuates within 10 inches of the surface during most years. Depressional areas are often ponded. The slope is less than 2 percent. These soils are loamy, siliceous, hyperthermic Grossarenic Ochraqualfs.

Holopaw soils are closely associated on the landscape with Basinger, Ona, and Samsula soils. Basinger and Ona soils do not have an argillic horizon. Ona soils are poorly drained and have a spodic horizon. Samsula soils are organic.

Typical pedon of Holopaw mucky fine sand, in an area of Basinger, Holopaw and Samsula soils, depressional; about 1.5 miles north of Enon Church, about 200 feet east and 1,000 feet south of the northwest corner of sec. 13, T. 28 S., R. 22 E.

A—0 to 6 inches; black (10YR 2/1) mucky fine sand; weak fine granular structure; very friable; many fine and medium roots; slightly acid; gradual smooth boundary.

E1—6 to 12 inches; dark gray (10YR 4/1) fine sand; single grained; loose; many fine roots; slightly acid; gradual smooth boundary.

E2—12 to 42 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine roots; slightly acid; gradual smooth boundary.

E3—42 to 52 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; neutral; abrupt wavy boundary.

Btg1—52 to 64 inches; gray (10YR 5/1) sandy loam; common fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; slightly sticky and slightly plastic; mildly alkaline; gradual wavy boundary.

Btg2—64 to 80 inches; light gray (5Y 7/1) sandy loam; massive; slightly sticky and slightly plastic; mildly alkaline.

Reaction ranges from strongly acid to neutral in the A and E horizons. It ranges from strongly acid to moderately alkaline in the Btg horizon.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. Typically, the texture is mucky fine sand, but the range includes fine sand and sand.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or sandy clay loam. Some pedons have a BC horizon that has the same color and texture range as the Btg horizon.

Some pedons have a Cg horizon that has hue of 10YR to 5GY, value of 4 to 7, and chroma of 2 or less. The texture is sand, fine sand, or loamy fine sand.

Immokalee Series

The Immokalee series consists of deep, poorly drained soil. These soils formed in sandy marine sediment. They are on broad plains on the flatwoods. A seasonal high water table is at a depth of 10 inches or less for more than 2 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Arenic Haplaquods.

Immokalee soils are closely associated on the landscape with Myakka, Ona, Smyrna, Wabasso, and Zolfo soils. Myakka, Ona, and Smyrna soils have a spodic horizon within 30 inches of the surface. Wabasso soils have an argillic horizon. Zolfo soils are somewhat poorly drained.

Typical pedon of Immokalee fine sand; about 1 mile east of the south runway of MacDill Air Force Base, 1,300 feet south and 2,650 feet east of the northwest corner of sec. 26, T. 30 S., R. 18 E.

A—0 to 8 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

E—8 to 36 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine and medium roots; very strongly acid; abrupt wavy boundary.

Bh1—36 to 46 inches; black (10YR 2/1) fine sand; weak fine granular structure; friable; common fine and medium roots; many organic matter coated sand grains; very strongly acid; clear wavy boundary.

Bh2—46 to 52 inches; dark reddish brown (5YR 3/2) fine sand; single grained; friable; few fine roots; many organic matter coated sand grains; very strongly acid; clear wavy boundary.

Bw—52 to 80 inches; dark brown (7.5YR 4/2) fine sand; single grained; loose; strongly acid.

The solum is more than 42 inches thick. Reaction ranges from extremely acid to medium acid throughout.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 or 2. The Bw horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4.

Some pedons have a C horizon that has hue of 10YR, value of 4 to 7, and chroma of 2 to 4.

Kendrick Series

The Kendrick series consists of deep, well drained soil. These soils formed in loamy marine sediment. They are on the uplands. The slope ranges from 2 to 5 percent. These soils are loamy, siliceous, hyperthermic Arenic Paleudults.

Kendrick soils are closely associated on the landscape with Candler soils. Candler soils are excessively drained and do not have an argillic horizon.

Typical pedon of Kendrick fine sand, 2 to 5 percent slopes; about 1 mile south of Thonotosassa, 75 feet east and 2,000 feet north of the southwest corner of sec. 15, T. 28 S., R. 20 E.

Ap—0 to 4 inches; grayish brown (10YR 5/2) fine sand; moderate medium granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

E—4 to 35 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common fine roots; strongly acid; clear wavy boundary.

Bt1—35 to 68 inches; brownish yellow (10YR 6/6) sandy loam; common medium distinct strong brown (7.5YR 4/6) mottles; weak fine subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

Bt2—68 to 80 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct strong brown (7.5YR 4/6) mottles; weak fine and medium subangular blocky structure; friable; very strongly acid.

The thickness of the solum is more than 60 inches. In some pedons, up to 3 percent weathered phosphatic pebbles and iron concretions are in the solum. Reaction ranges from very strongly acid to medium acid throughout except in areas where the surface layer has been limed.

The Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 8.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. The texture is sandy loam, fine sandy loam, or sandy clay loam.

Kesson Series

The Kesson series consists of deep, very poorly drained soil. These soils formed in deposits of shell

fragments and sandy marine sediment. They are in tidal swamps and marshes. The slope is less than 1 percent. These soils are siliceous, hyperthermic Typic Psammaquents.

Kesson soils are closely associated on the landscape with Myakka and St. Augustine soils. Myakka soils have a spodic horizon and are poorly drained. St. Augustine soils are somewhat poorly drained.

Typical pedon of Kesson muck, frequently flooded; about 2 miles south of Gibsonton, 4,000 feet north and 3,000 feet west of the northeast corner of sec. 3, T. 31 S., R. 19 E.

A—0 to 5 inches; black (10YR 2/1) muck; massive; about 10 percent shell fragments; calcareous; moderately alkaline; clear smooth boundary.

Cg1—5 to 38 inches; gray (5Y 6/1) fine sand; common fine distinct dark greenish gray (5GY 4/1) streaks; single grained; loose; about 10 percent shell fragments; calcareous; moderately alkaline; clear smooth boundary.

Cg2—38 to 80 inches; light olive gray (5Y 6/2) fine sand; single grained; loose; about 25 percent shell fragments; calcareous; moderately alkaline.

The content of sulfur is more than 0.75 percent within 20 inches of the surface. Reaction ranges from mildly alkaline to strongly alkaline throughout.

The A horizon has hue of 10YR, value of 2 to 6, and chroma of 1 to 3. The content of shell fragments ranges from about 5 to 15 percent.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 3. The content of shell fragments ranges from about 5 to 30 percent.

Lake Series

The Lake series consists of deep, excessively drained soils. These soils formed in sandy marine sediment. They are on the uplands. The water table is at a depth of more than 80 inches. The slope ranges from 0 to 5 percent. These soils are hyperthermic, coated Typic Quartzipsamments.

Lake soils are closely associated on the landscape with Kendrick, Millhopper, and Tavares soils. Kendrick soils are well drained, and Millhopper and Tavares soils are moderately well drained.

Typical pedon of Lake fine sand, 0 to 5 percent slopes; about 2.5 miles north of Seffner, 2,650 feet west and 2,200 feet north of the southeast corner of sec. 23, T. 28 S., R. 20 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) fine sand; weak fine crumb structure; friable; many fine and medium roots; strongly acid; gradual wavy boundary.

C1—4 to 28 inches; strong brown (7.5YR 5/6) fine sand; single grained; loose; many fine and medium roots; strongly acid; gradual wavy boundary.

C2—28 to 68 inches; reddish yellow (7.5YR 6/8) fine sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

C3—68 to 80 inches; strong brown (7.5YR 5/6) fine sand; single grained; loose; strongly acid.

Reaction is very strongly acid or strongly acid throughout except in areas where the surface layer has been limed.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. In some pedons, a few small pockets of uncoated sand grains occur, either individually or collectively, but these are not indicative of wetness.

Lochloosa Series

The Lochloosa series consists of deep, somewhat poorly drained soils. These soils formed in sandy and loamy marine sediment. They are on the uplands. A seasonal high water table is at a depth of 30 to 60 inches for 1 to 7 months during most years. The slope ranges from 0 to 5 percent. These soils are loamy, siliceous, hyperthermic Aquic Arenic Paleudults.

Lochloosa soils are closely associated on the landscape with Adamsville, Micanopy, and Millhopper soils. Adamsville soils do not have an argillic horizon. Micanopy soils have an argillic horizon within 20 inches of the soil surface. Millhopper soils are moderately well drained and have a surface and subsurface layer that is more than 40 inches thick.

Typical pedon of Lochloosa fine sand, in an area of Lochloosa-Micanopy fine sands, 0 to 5 percent slopes; about 2 miles west of Seffner, 1,200 feet east and 1,750 feet south of the northwest corner of sec. 4, T. 29 S., R. 20 E.

Ap—0 to 7 inches; dark gray (10YR 4/1) fine sand; weak fine and medium granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.

E1—7 to 15 inches; very pale brown (10YR 7/3) fine sand; weak fine and medium granular structure; very friable; few fine roots; strongly acid; clear wavy boundary.

E2—15 to 28 inches; pale brown (10YR 6/3) fine sand; single grained; loose; few fine roots; strongly acid; clear wavy boundary.

Bt1—28 to 35 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine and medium subangular blocky structure; very friable; few fine roots; strongly acid; clear wavy boundary.

Bt2—35 to 40 inches; yellowish brown (10YR 5/4) sandy clay loam; common fine distinct yellowish red (5YR 5/6) and gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable; few fine roots; very strongly acid; clear wavy boundary.

Btg—40 to 69 inches; gray (10YR 6/1) sandy clay loam; few medium prominent strong brown (7.5YR 5/8) and red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; sticky and slightly plastic; about 2 percent phosphatic pebbles and nodules of ironstone; very strongly acid; gradual wavy boundary.

Cg—69 to 80 inches; gray (10YR 6/1) sandy clay loam; massive; sticky and plastic; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 4.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 8. The texture is sandy clay loam or sandy loam. In some pedons, the Bt horizon has 1 to 5 percent, by volume, plinthite. The Btg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2.

The Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is sandy loam or sandy clay loam.

Malabar Series

The Malabar series consists of deep, poorly drained soils. These soils formed in sandy and loamy marine sediment. They are on broad, low-lying flats and in shallow depressions on the flatwoods. A seasonal high water table is within 10 inches of the soil surface for 2 to 6 months during most years. Depressions are subject to ponding during wet periods. The slope is less than 2 percent. These soils are loamy, siliceous, hyperthermic Grossarenic Ochraqualfs.

Malabar soils are closely associated on the landscape with Basinger, Felda, Holopaw, Myakka, Ona, and Wabasso soils. Basinger soils are very poorly drained. They do not have an argillic horizon. Felda soils have an argillic horizon within 40 inches of the surface. Holopaw soils are very poorly drained and do not have a Bw horizon. Myakka and Ona soils are poorly drained. They do not have an argillic horizon. Myakka, Ona, and Wabasso soils have a spodic horizon.

Typical pedon of Malabar fine sand; about 2.5 miles west of Cosme, 2,250 feet east and 2,000 feet north of the southwest corner of sec. 30, T. 27 S., R. 17 E.

A—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; friable; many fine and medium roots; slightly acid; gradual smooth boundary.

E—4 to 12 inches; light brownish gray (10YR 6/2) fine sand; single grained; friable; few fine and medium roots; slightly acid; gradual wavy boundary.

Bw—12 to 30 inches; brownish yellow (10YR 6/6) fine sand; weak fine granular structure; very friable; few fine roots; medium acid; clear wavy boundary.

E'—30 to 50 inches; pale brown (10YR 6/3) fine sand; single grained; nonsticky and nonplastic; slightly acid; abrupt wavy boundary.

Btg—50 to 66 inches; gray (10YR 6/1) fine sandy loam; few coarse distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; slightly sticky and slightly plastic; neutral; gradual wavy boundary.

Cg—66 to 80 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; neutral.

The thickness of the solum ranges from 46 to 80 inches. Reaction ranges from strongly acid to moderately alkaline throughout.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The Bw horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 4 to 8. The E' horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3. The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. Typically, the texture is fine sandy loam, but the range includes sandy loam and sandy clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or it is neutral and has value of 5 to 7. The texture is fine sand or loamy fine sand.

Micanopy Series

The Micanopy series consists of deep, somewhat poorly drained soils. These soils formed in loamy and clayey marine sediment. They are on the uplands. A seasonal high water table is at a depth of 30 to 60 inches for 1 to 4 months during most years. The slope ranges from 0 to 5 percent. These soils are fine, mixed, hyperthermic Aquic Paleudalfs.

Micanopy soils are closely associated on the landscape with Adamsville, Millhopper, and Lochloosa soils. Adamsville soils do not have an argillic horizon. Millhopper and Lochloosa soils have a surface and subsurface layer more than 20 inches thick. In addition, Millhopper soils are moderately well drained.

Typical pedon of Micanopy fine sand, in an area of Lochloosa-Micanopy fine sands, 0 to 5 percent slopes; about 1,500 feet east and 2,000 feet south of the northwest corner of sec. 4, T. 29 S., R. 20 E.

Ap—0 to 5 inches; very dark gray (10YR 3/1) fine sand; moderate medium granular structure; friable;

common fine and medium roots; strongly acid; abrupt smooth boundary.

E—5 to 15 inches; brown (10YR 5/3) fine sand; single grained; loose; few common fine roots; strongly acid; clear wavy boundary.

Bt—15 to 25 inches; yellowish brown (10YR 5/4) sandy clay loam; common fine and medium distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; strongly acid; clear wavy boundary.

Btg—25 to 59 inches; gray (10YR 5/1) sandy clay; many medium and coarse prominent dark red (10YR 3/6) and strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; sticky and plastic; strongly acid; clear wavy boundary.

BCg—59 to 80 inches; gray (5YR 6/1) sandy clay; common coarse prominent strong brown (7.5YR 5/6) and red (2.5YR 4/6) mottles; weak fine subangular blocky structure; sticky and plastic; strongly acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to medium acid throughout.

The Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 4. The texture is fine sand or loamy fine sand.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 6. The texture is sandy clay loam or sandy clay. The weighted average content of clay is more than 35 percent in the upper 20 inches. The Btg horizon has hue of 10YR, value of 5 or 6, and chroma of 1; or it is neutral and has value of 5 or 6. The BCg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. The texture is sandy clay or sandy clay loam.

Some pedons have a Cg horizon that has hue of 10YR to 5GY, value of 5 to 7, and chroma of 1 or 2. The texture is sandy clay loam or sandy clay.

Millhopper Series

The Millhopper series consists of deep, moderately well drained soils. These soils formed in sandy and loamy marine sediment. They are on uplands. A seasonal high water table is at a depth of 40 to 60 inches for 1 to 4 months during most years. The slope ranges from 0 to 8 percent. These soils are loamy, siliceous, hyperthermic Grossarenic Paleudults.

Millhopper soils are closely associated on the landscape with Candler, Myakka, Seffner, and Tavares soils. These associated soils do not have an argillic horizon. Candler soils are excessively drained. Myakka soils are poorly drained and have a spodic horizon. Seffner soils are somewhat poorly drained. Tavares soils are moderately well drained.

Typical pedon of Millhopper fine sand, in an area of Tavares-Millhopper fine sands, 0 to 5 percent slopes; about 4.5 miles west of Bloomingdale, 50 feet west and 850 feet south of the northeast corner of sec. 8, T. 30 S., R. 20 E.

A—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak medium granular structure; very friable; many fine and medium roots; medium acid; clear wavy boundary.

E1—4 to 9 inches; brown (10YR 5/3) fine sand; single grained; loose; few fine roots; slightly acid; clear wavy boundary.

E2—9 to 25 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; few fine roots; slightly acid; clear wavy boundary.

E3—25 to 48 inches; light gray (10YR 7/2) fine sand; common fine faint white mottles; single grained; loose; few fine roots; medium acid; clear wavy boundary.

E4—48 to 57 inches; light gray (10YR 7/2) fine sand; single grained; loose; medium acid; clear wavy boundary.

Bt—57 to 62 inches; very pale brown (10YR 7/4) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary.

Btg—62 to 80 inches; gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; strongly acid.

Reaction ranges from very strongly acid to slightly acid in the A and E horizons. It ranges from very strongly acid to medium acid in the Bt horizon.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8 in the upper part and has hue of 10YR, value of 6 to 8, and chroma of 2 to 4 in the lower part. Mottles, indicative of wetness, occur at a depth of more than 40 inches.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 7. Typically, the texture is sandy clay loam, but the range includes sandy loam, fine sandy loam, and loamy sand. If loamy sand occurs in the Bt horizon, it is less than 8 inches thick and is underlain by sandy clay loam in the lower part of the Bt horizon.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 4. The texture is sandy loam or sandy clay loam.

Myakka Series

The Myakka series consists of deep, poorly drained and very poorly drained soils. These soils formed in

sandy marine sediment. They are on broad plains on the flatwoods and in tidal areas. A seasonal high water table is within 10 inches of the soil surface for 1 to 4 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Aeric Haplaquods.

Myakka soils are closely associated on the landscape with Basinger, Immokalee, Kesson, Pomello, Smyrna, and Wabasso soils. Basinger and Kesson soils do not have a spodic horizon. Immokalee and Pomello soils have a spodic horizon at a depth of more than 30 inches. In addition, Pomello soils are moderately well drained. Smyrna soils have a spodic horizon within 20 inches of the surface. Wabasso soils have an argillic horizon.

Typical pedon of Myakka fine sand; about 2.5 miles west of Chapman, 20 feet west and 2,250 feet north of the southeast corner of sec. 21, T. 27 S., R. 18 E.

A—0 to 5 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—5 to 20 inches; gray (10YR 6/1) fine sand; single grained; loose; common fine and medium roots; strongly acid; abrupt wavy boundary.

Bh1—20 to 25 inches; black (N 2/0) fine sand; moderate medium granular structure; friable; many fine roots; organic matter coated sand grains; very strongly acid; clear smooth boundary.

Bh2—25 to 30 inches; dark reddish brown (5YR 3/3) fine sand; weak coarse subangular blocky structure; friable; common fine roots; very strongly acid; clear smooth boundary.

BC—30 to 38 inches; brownish yellow (10YR 6/6) fine sand; single grained; very friable; few fine roots; strongly acid; clear wavy boundary.

C1—38 to 55 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; strongly acid; clear wavy boundary.

C2—55 to 80 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; strongly acid.

The combined thickness of the A and E horizons ranges from 20 to 30 inches. Reaction ranges from extremely acid to slightly acid. In the tidal areas, reaction ranges from neutral to moderately alkaline.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3; or it is neutral and has value of 2 or 3.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3. In some pedons, the C horizon has 5 to 35 percent, by volume, shell fragments.

Ona Series

The Ona series consists of deep, poorly drained soils. These soils formed in sandy marine sediment. They are on broad plains on the flatwoods. A seasonal high water table is within 10 inches of the soil surface for more than 2 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Typic Haplaquods.

Ona soils are closely associated on the landscape with Basinger, Immokalee, Myakka, and Smyrna soils. Basinger soils are very poorly drained and do not have a spodic horizon. Immokalee, Myakka, and Smyrna soils have an albic horizon and have a spodic horizon at a depth of more than 10 inches.

Typical pedon of Ona fine sand; about 4.8 miles west of Welcome, 2,550 feet south and 500 feet east of the southwest corner of sec. 35, T. 30 S., R. 21 E.

A—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

Bh1—4 to 8 inches; black (10YR 2/1) fine sand; weak coarse subangular blocky structure; firm; common fine and medium roots; many organic matter coated sand grains; strongly acid; gradual wavy boundary.

Bh2—8 to 22 inches; very dark brown (10YR 2/2) fine sand; weak fine granular structure; friable; common fine roots; many organic matter coated sand grains; strongly acid; clear wavy boundary.

Cg—22 to 80 inches; light gray (10YR 7/1) fine sand; single grained; loose; strongly acid.

Reaction ranges from extremely acid to medium acid throughout.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The Bh horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3.

The Cg horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4.

Orlando Series

The Orlando series consists of deep, well drained soils. These soils formed in sandy marine sediment. They are on the uplands. A seasonal high water table is at a depth of more than 72 inches. The slope ranges from 0 to 5 percent. These soils are sandy, siliceous, hyperthermic Quartzipsammentic Haplumbrepts.

Orlando soils are closely associated on the landscape with Gainesville, Seffner, and Tavares soils. Gainesville and Tavares soils do not have an umbric epipedon. In addition, Tavares soils are moderately well drained. Seffner soils are somewhat poorly drained.

Typical pedon of Orlando fine sand, 0 to 5 percent slopes; about 2.5 miles south of Lithia, 2,000 feet east and 1,700 feet north of the southwest corner of sec. 34, T. 30 S., R. 21 E.

A1—0 to 8 inches; black (10YR 2/1) fine sand; weak fine crumb structure; friable; many fine, medium, and coarse roots; mixed organic matter and uncoated sand grains; strongly acid; gradual wavy boundary.
A2—8 to 20 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; friable; many fine and medium roots; strongly acid; gradual wavy boundary.
AC—20 to 32 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.
C1—32 to 60 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine roots in upper part; strongly acid; gradual wavy boundary.
C2—60 to 80 inches; pale brown (10YR 6/3) fine sand; few fine distinct brownish yellow (10YR 6/6), light gray (10YR 7/1), and strong brown (7.5YR 4/6) mottles; single grained; loose; common uncoated sand grains; strongly acid.

Reaction ranges from very strongly acid to slightly acid in the A horizon and from very strongly acid to medium acid in the C horizon.

The A horizon has hue of 10YR, value of 1 to 3, and chroma of 1 or 2.

The AC horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 4.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 3 to 8.

Orsino Series

The Orsino series consists of deep, moderately well drained soils. These soils formed in sandy marine sediment. They are on the uplands and slope breaks to stream channels. A seasonal high water table is at a depth of 40 to 60 inches for more than 6 months during most years. The slope ranges from 0 to 5 percent. These soils are hyperthermic, uncoated Spodic Quartzipsamments.

Orsino soils are closely associated on the landscape with Archbold, Pomello, and Millhopper soils. Archbold soils do not have a B horizon. Pomello soils have a spodic horizon. Millhopper soils have an argillic horizon.

Typical pedon of Orsino fine sand, 0 to 5 percent slopes; about 2 miles southwest of Bloomingdale, 2,400 feet west and 1,400 feet north of the southeast corner of sec. 14, T. 30 S., R. 20 E.

A—0 to 2 inches; dark gray (10YR 4/1) fine sand; single grained; loose; many fine and medium roots; strongly acid; gradual smooth boundary.
E1—2 to 15 inches; light gray (10YR 7/1) fine sand; single grained; loose; many fine and medium roots; strongly acid; gradual wavy boundary.
E2—15 to 31 inches; white (10YR 8/1) fine sand; single grained; loose; common fine roots; strongly acid; abrupt irregular boundary.
Bw/Bh—31 to 48 inches; brownish yellow (10YR 6/6) fine sand, (Bw); very dark grayish brown (10YR 3/2) fine sand, (Bh); single grained; loose; few fine roots; medium acid; gradual wavy boundary.
BC—48 to 72 inches; yellow (10YR 7/6) fine sand; common fine distinct yellowish red (5YR 4/6) mottles; single grained; loose; medium acid; gradual wavy boundary.
C—72 to 80 inches; pale brown (10YR 6/3) fine sand; single grained; loose; medium acid.

Reaction ranges from extremely acid to medium acid throughout.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 7 or 8, and chroma of 1.

The Bw part of the Bw/Bh horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. The Bh part has hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 or 3. The BC horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 3 or 4.

Paisley Series

The Paisley series consists of deep, very poorly drained soils. These soils formed in clayey marine sediment. They are in depressions and sloughs. A seasonal high water table is within 10 inches of the soil surface for 9 or more months during most years. The slope is less than 1 percent. These soils are fine, montmorillonitic, hyperthermic, Typic Albaqualfs.

Paisley soils are closely associated on the landscape with Basinger, Holopaw, Samsula, and Smyrna soils. Basinger and Smyrna soils are sandy throughout and do not have an argillic horizon. In addition, Smyrna soils have a spodic horizon. Holopaw soils are sandy to a depth of 40 to 79 inches. Samsula soils are organic.

Typical pedon of Paisley fine sand, depressional; about 3.5 miles north of Clarkwild, 1,000 feet east and 1,500 feet north of the southwest corner of sec. 30, T. 27 S., R. 20 E.

A—0 to 2 inches; very dark gray (10YR 3/1) fine sand; moderate medium granular structure; very friable; many fine and medium roots; medium acid; abrupt smooth boundary.
E—2 to 4 inches; grayish brown (10YR 5/2) fine sand; weak medium granular structure; very friable;

nonsticky and nonplastic; common fine roots; medium acid; abrupt wavy boundary.

Btg1—4 to 24 inches; gray (10YR 5/1) sandy clay; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; very sticky and plastic; few fine roots; mildly alkaline; clear wavy boundary.

Btg2—24 to 52 inches; light gray (10YR 6/1) sandy clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; very sticky and plastic; mildly alkaline; clear wavy boundary.

BCg—52 to 80 inches; light gray (10YR 6/1) sandy clay; many large distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; firm; mildly alkaline.

The thickness of the solum ranges from 40 to more than 72 inches. Reaction ranges from very strongly acid to moderately alkaline in the A and E horizons and from medium acid to moderately alkaline in the B horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1. The texture is sandy clay or clay.

The BCg horizon has hue of 10YR, value of 5 to 7, and chroma of 1. Some pedons have a Cg horizon at a depth of more than 72 inches.

Pinellas Series

The Pinellas series consists of deep, poorly drained soils. These soils formed in sandy marine sediment. They are on broad plains on the flatwoods. A seasonal high water table is within 10 inches of the soil surface for less than 3 months during most years. The slope is less than 2 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

These soils are taxadjuncts to the Pinellas series because they have sandy soil material mixed with shell fragments in the lower part of the particle-size control section. They are similar in use, management, and behavior to the soils of the Pinellas series.

Pinellas soils are closely associated on the landscape with Felda, Holopaw, and Malabar soils. These associated soils do not have a Bk horizon. Holopaw and Malabar soils have an argillic horizon at a depth of more than 40 inches.

Typical pedon of Pinellas fine sand; about 2 miles south of Sun City Center, 1,270 feet west and 1,500 feet north of the southeast corner of sec. 34, T. 32 S., R. 18 E.

A—0 to 4 inches; black (10YR 2/1) fine sand; weak fine crumb structure; very friable; many fine and medium roots; medium acid; clear smooth boundary.

E—4 to 11 inches; light gray (10YR 6/1) fine sand; single grained; loose; many fine and medium roots; medium acid; clear wavy boundary.

Bk—11 to 22 inches; light gray (10YR 7/2) fine sand; common coarse distinct light yellowish brown (10YR 6/4) mottles; massive; friable; few fine roots; secondary carbonates in interstices and in root channels; moderately alkaline; clear wavy boundary.

Btg—22 to 27 inches; light olive gray (5Y 6/2) sandy clay loam; common medium distinct olive brown (2.5Y 4/4) mottles; weak fine subangular blocky structure; slightly sticky and slightly plastic; few fine roots; less than 15 percent limestone cobbles in lower part; mildly alkaline; clear smooth boundary.

2Cg—27 to 80 inches; greenish gray (5GY 6/1) loamy sand; massive; very friable; about 45 percent, by volume, shell fragments; moderately alkaline.

The solum is less than 60 inches thick. Reaction ranges from medium acid to mildly alkaline in the A and E horizons and from neutral to strongly alkaline in the Bk and Btg horizons. It is moderately alkaline in the 2Cg horizon.

The A horizon has hue of 10YR, value of 2 to 6, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 3.

The Bk horizon has hue of 10YR, value of 6 to 8, and chroma of 1 to 3. Secondary carbonate accumulations occur as coatings on sand grains and root channels. The Btg horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 or 2; or it is neutral and has value of 4 to 8. Some pedons have secondary carbonate accumulations of less than 5 percent calcium carbonate equivalent.

The 2Cg horizon is a mixture of sandy material and shell fragments in varying proportions. The color of this horizon is largely dependent on the color of the shell fragments; however, the sand has color that is similar that of the Btg horizon.

Pomello Series

The Pomello series consists of deep, moderately well drained soils. These soils formed in sandy marine sediment. They are on low ridges on the flatwoods. A seasonal high water table is at a depth of 24 to 40 inches for 1 to 4 months during most years. The slope ranges from 0 to 5 percent. These soils are sandy, siliceous, hyperthermic Arenic Haplohumods.

Pomello soils are closely associated on the landscape with Felda, Holopaw, Immokalee, and Smyrna soils. Felda soils are poorly drained, and Holopaw soils are very poorly drained. These soils do not have a spodic horizon but have an argillic horizon. Immokalee and Smyrna soils are poorly drained.

Typical pedon of Pomello fine sand, 0 to 5 percent slopes; about 7 miles east of Ruskin, 50 feet west and

1,280 feet north of the southeast corner of sec. 5, T. 32 S., R. 20 E.

A—0 to 3 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.
E1—3 to 9 inches; light gray (10YR 6/1) fine sand; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.
E2—9 to 43 inches; light gray (10YR 7/2) fine sand; single grained; loose; few fine and medium roots; very strongly acid; abrupt wavy boundary.
Bh1—43 to 46 inches; dark brown (7.5YR 3/2) fine sand; massive; friable; few fine roots; very strongly acid; clear wavy boundary.
Bw—46 to 55 inches; brown (7.5YR 4/4) fine sand; massive; friable; few fine roots; very strongly acid; clear wavy boundary.
C—55 to 80 inches; grayish brown (10YR 5/2) fine sand; single grained; very strongly acid.

Reaction ranges from very strongly acid to medium acid throughout.

The A horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 4. The Bw horizon has hue of 7.5YR, value of 4, and chroma of 2 or 4.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

St. Augustine Series

The St. Augustine series consists of deep, somewhat poorly drained soils. These soils were formed by dredge and fill operations. They are on flats and ridges bordering Tampa Bay. A seasonal high water table is at a depth of 20 to 40 inches for 2 to 6 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Udalfic Arents.

St. Augustine soils are closely associated on the landscape with Kesson and Myakka soils. Kesson soils are very poorly drained. Myakka soils are poorly drained and very poorly drained and have a spodic horizon.

Typical pedon of St. Augustine fine sand; about 1 mile east of the south runway of MacDill Air Force Base, 2,000 feet east and 1,750 feet south of the northwest corner of sec. 26, T. 30 S., R. 18 E.

A—0 to 3 inches; dark gray (10YR 4/1) fine sand; weak medium granular structure; very friable; many uncoated light gray (10YR 7/1) sand grains; moderately alkaline; clear smooth boundary.
C1—3 to 12 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; moderately alkaline; gradual smooth boundary.
C2—12 to 30 inches; light gray (10YR 7/2) fine sand; common fine distinct brownish yellow (10YR 6/6) mottles; single grained; loose; few bodies of grayish brown (2.5Y 5/2) sandy clay 1 centimeter to 3 centimeters across; moderately alkaline; clear smooth boundary.
C3—30 to 80 inches; gray (10YR 6/1) fine sand; single grained; loose; about 10 percent shell fragments; moderately alkaline.

Reaction ranges from slightly acid to moderately alkaline throughout. Shells make up 5 to 20 percent of the particle-size control section.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 3 to 7, and chroma of 1 to 3. The texture is fine sand or loamy sand that has loamy and clayey fragments occurring between depths of 10 and 40 inches. In some pedons, the lower part of the C horizon is stratified shells, sand, loamy sand, or sandy clay loam.

St. Johns Series

The St. Johns series consists of deep, poorly drained soils. These soils formed in sandy marine sediment. They are on broad, low-lying plains on the flatwoods. A seasonal high water table is within 15 inches of the soil surface for 2 to 6 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Typic Haplaquods.

St. Johns soils are closely associated on the landscape with Basinger, Floridana, Myakka, and Ona soils. Basinger and Floridana soils are very poorly drained and do not have a spodic horizon. Floridana soils have an argillic horizon. Myakka and Ona soils do not have an umbric epipedon.

Typical pedon of St. Johns fine sand; about 6 miles east of Ruskin, 1,100 feet west and 2,650 feet north of the southeast corner of sec. 8, T. 32 S., R. 20 E.

A1—0 to 6 inches; black (10YR 2/1) fine sand; weak fine crumb structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.
A2—6 to 12 inches; very dark grayish brown (10YR 3/2) fine sand; single grained; loose; many fine and medium roots; very strongly acid; clear wavy boundary.
E—12 to 29 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine and medium roots; very strongly acid; abrupt wavy boundary.
Bh1—29 to 36 inches; black (10YR 2/1) fine sand; massive; firm; few fine roots; strongly acid; clear wavy boundary.

Bh2—36 to 46 inches; dark reddish brown (5YR 3/2) fine sand; massive; firm; very strongly acid; gradual wavy boundary.

Bw—46 to 50 inches; dark yellowish brown (10YR 4/4) fine sand; single grained; very strongly acid; gradual wavy boundary.

C—50 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; very strongly acid.

Reaction ranges from extremely acid to strongly acid throughout.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The Bh horizon has hue of 5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. The Bw horizon has hue of 10YR, value of 3 to 6, and chroma of 3 or 4.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3.

Samsula Series

The Samsula series consists of deep, very poorly drained soils. These soils formed in well decomposed organic matter underlain by sandy marine sediment. They are in depressions, swamps, and sloughs and along broad, poorly defined drainageways. A seasonal high water table is within 10 inches of the soil surface. The slope is less than 1 percent. These soils are sandy or sandy-skeletal, siliceous, dysic, hyperthermic Terric Medisaprists.

Samsula soils are closely associated on the landscape with Basinger, Chobee, Eaton, Felda, and Myakka soils. The associated soils formed in mineral material. In addition, Chobee, Eaton, and Felda soils have an argillic horizon. Myakka soils have a spodic horizon.

Typical pedon of Samsula muck, in an area of Basinger, Holopaw and Samsula soils, depressional; about 0.5 mile northwest of Midway, 10 feet east and 1,310 feet north of the southwest corner of sec. 3, T. 28 S., R. 22 E.

Oa1—0 to 10 inches; black (5YR 2/1) muck; about 20 percent fiber, 8 percent rubbed; massive; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

Oa2—10 to 34 inches; dark reddish brown (5YR 2/2) muck about 15 percent fiber, 5 percent rubbed; massive; friable; many fine and medium roots; very strongly acid; clear wavy boundary.

2A—34 to 40 inches; black (10YR 2/1) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

2C—40 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; very strongly acid.

The thickness of the organic material ranges from 16 to 48 inches. Reaction is very strongly acid or strongly acid in the surface layer and is extremely acid to strongly acid in the underlying horizons.

The Oa horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. The content of fiber ranges from 15 to 45 percent, unrubbed; and ranges from 5 to 16 percent, rubbed.

The 2A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The 2C horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

Seffner Series

The Seffner series consists of deep, somewhat poorly drained soils. These soils formed in sandy marine sediment. They are on low ridges and rims of depressions on the flatwoods. A seasonal high water table is at a depth of 20 to 40 inches for 2 to 6 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Quartzipsammentic Haplumbrepts.

Seffner soils are closely associated on the landscape with Adamsville, Ona, and Smyrna soils. Adamsville soils do not have an umbric epipedon. Ona and Smyrna soils are poorly drained and have a spodic horizon.

Typical pedon of Seffner fine sand; about 0.5 mile east and 1 mile south of Plant City, 2,400 feet north and 1,950 feet west of the southeast corner of sec. 33, T. 28 S., R. 22 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; few very fine roots; strongly acid; abrupt smooth boundary.

A—9 to 13 inches; very dark gray (10YR 3/1) fine sand; few medium distinct dark grayish brown (10YR 4/2) mottles; weak fine granular structure; very friable; few very fine roots; medium acid; clear wavy boundary.

AC—13 to 21 inches; dark gray (10YR 4/1) fine sand; common medium distinct brown (10YR 5/3) mottles; single grained; loose; few very fine roots; tongues of very dark gray (10YR 3/1) material to a depth of 20 inches; strongly acid; clear wavy boundary.

C1—21 to 35 inches; very pale brown (10YR 7/3) fine sand; common medium prominent yellowish red (5YR 5/8) and distinct white (10YR 8/2) mottles; single grained; loose; strongly acid; gradual wavy boundary.

C2—35 to 63 inches; light gray (10YR 7/2) fine sand; few fine prominent yellowish red (5YR 5/8) mottles; single grained; loose; strongly acid; clear irregular boundary.

C3—63 to 80 inches; white (10YR 8/2) fine sand; common medium distinct pale brown (10YR 6/3)

and yellowish brown (10YR 5/4) mottles; single grained; loose; about 10 percent fine and medium weathered phosphatic nodules; strongly acid.

The thickness of the umbric epipedon ranges from 10 to 20 inches. The texture is sand or fine sand to a depth of 80 inches or more. Reaction ranges from very strongly acid to neutral throughout.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3.

The AC horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 4. Some pedons do not have an AC horizon.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3. Mottles range from few to many and are fine or medium. Some pedons do not have phosphatic nodules. Some pedons have cemented layers in the substratum at a depth of more than 40 inches.

Smyrna Series

The Smyrna series consists of deep, poorly drained soils. These soils formed in sandy marine sediment. They are on broad, low-lying, convex swells on the flatwoods. A seasonal high water table is within 10 inches of the soil surface for more than 2 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Aeric Haplaquods.

Smyrna soils are closely associated on the landscape with Basinger, Immokalee, Myakka, Ona, Pomello, and Wabasso soils. Basinger soils do not have a spodic horizon. Immokalee, Myakka, and Pomello soils have a spodic horizon at a depth of more than 20 inches. Ona soils do not have an albic horizon. Wabasso soils have an argillic horizon.

Typical pedon of Smyrna fine sand; about 2.5 miles west of Lutz, 750 feet east and 700 feet south of the northwest corner of sec. 15, T. 27 S., R. 18 E.

A—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak coarse granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

E—4 to 12 inches; gray (10YR 6/1) fine sand; single grained; loose; common fine roots; strongly acid; abrupt wavy boundary.

Bh1—12 to 15 inches; dark brown (7.5YR 3/2) fine sand; massive; friable; few fine roots; organic matter coated sand grains; very strongly acid; gradual wavy boundary.

Bh2—15 to 20 inches; very dark grayish brown (10YR 3/2) fine sand; massive; friable; organic matter coated sand grains; very strongly acid; clear wavy boundary.

C1—20 to 45 inches; light brownish gray (10YR 6/2) fine sand; common fine distinct yellowish brown (10YR 5/4) mottles; single grained; loose; strongly acid; clear wavy boundary.

C2—45 to 80 inches; brown (10YR 5/3) fine sand; single grained; loose; strongly acid.

The combined thickness of the A and E horizons is less than 20 inches. Reaction ranges from extremely acid to neutral in the A, E, and Bh horizons except where limed and is very strongly acid or strongly acid in the C horizon.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 to 4.

In some pedons, a second sequum of E' and B'h horizons is at a depth of more than 40 inches. The sequum has the same color range as the E and Bh horizons.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 4.

Tavares Series

The Tavares series consists of deep, moderately well drained soils. These soils formed in sandy marine sediment. They are on low-lying areas on the uplands and on low ridges on the flatwoods. A seasonal high water table is at a depth of 40 to 80 inches for more than 6 months during most years. The slope ranges from 0 to 8 percent. These soils are hyperthermic, uncoated Typic Quartzipsamments.

Tavares soils are closely associated on the landscape with Candler, Millhopper, Myakka, and Zolfo soils. Candler soils are excessively drained. Millhopper soils have an argillic horizon. Myakka and Zolfo soils have a spodic horizon. Myakka soils are poorly drained, and Zolfo soils are somewhat poorly drained.

Typical pedon of Tavares fine sand, in an area of Tavares-Millhopper fine sands, 0 to 5 percent slopes; about 2.5 miles east of Lutz, 1,000 feet north and 1,550 feet west of the southeast corner of sec. 8, T. 27 S., R. 19 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; friable; many fine and medium roots; strongly acid; abrupt wavy boundary.

C1—6 to 32 inches; pale brown (10YR 6/3) fine sand; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.

C2—32 to 40 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

C3—40 to 80 inches; light gray (10YR 7/2) fine sand; single grained; loose; strongly acid.

Soil reaction ranges from extremely acid to medium acid throughout. Silt and clay totals 5 percent or less between depths of 10 and 40 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The upper part of the C horizon has hue of 10YR, value of 6 to 8, and chroma of 3 or 4. The lower part has hue of 10YR, value of 6 to 8, and chroma of 1 to 4.

Wabasso Series

The Wabasso series consists of deep, poorly drained soils. These soils formed in sandy and loamy marine sediment. They are on broad plains on the flatwoods. A seasonal high water table is within 10 inches of the soil surface for less than 2 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Alfic Haplaquods.

Wabasso soils are closely associated on the landscape with Felda, Malabar, and Myakka soils. Felda and Malabar soils do not have a spodic horizon. Myakka soils do not have an argillic horizon.

Typical pedon of Wabasso fine sand; about 4.5 miles north of Temple Terrace, 400 feet east and 2,150 feet north of the southwest corner of sec. 23, T. 27 S., R. 19 E.

A—0 to 7 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

E—7 to 29 inches; gray (10YR 6/1) fine sand; single grained; loose; common fine and medium roots; strongly acid; abrupt wavy boundary.

Bh1—29 to 32 inches; black (10YR 2/1) fine sand; massive; friable; common fine and medium roots; strongly acid; gradual smooth boundary.

Bw—32 to 38 inches; dark brown (7.5YR 3/4) fine sand; massive; friable; few fine roots; strongly acid; clear wavy boundary.

Btg1—38 to 46 inches; light gray (5Y 7/1) sandy clay loam; weak coarse subangular blocky structure; slightly sticky and slightly plastic; few fine roots; neutral; gradual wavy boundary.

Btg2—46 to 60 inches; light greenish gray (5GY 7/1) sandy clay loam; many medium distinct dark brown (10YR 3/3) mottles; weak medium subangular blocky structure; slightly sticky and slightly plastic; mildly alkaline; gradual wavy boundary.

Cg—60 to 80 inches; gray (5Y 5/1) loamy sand; massive; friable; mildly alkaline.

The thickness of the solum is 60 inches or more. The combined thickness of the A and E horizons is less than 30 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. Reaction ranges from extremely acid to slightly acid.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Reaction ranges from extremely acid to slightly acid.

The Bh horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3; or it has hue of 7.5YR, value of 3, and chroma of 2. Some pedons have a Bw horizon that is underlain by a thin E' horizon. In pedons that do not have a Bw horizon, the Bh horizon is underlain by a thin E' horizon in some pedons. The E' horizon has the same range in color as the E horizon. Reaction ranges from very strongly acid to neutral throughout. The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 3. The texture is sandy loam or sandy clay loam. Reaction ranges from very strongly acid to moderately alkaline.

The C horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or it is neutral and has value of 5 to 7. The texture is loamy sand or sandy loam. In some pedons, the C horizon contains fragments of shells.

Winder Series

The Winder series consists of deep, poorly drained soils. These soils formed in loamy marine sediment. They are in broad sloughs on the flatwoods. A seasonal high water table is within 10 inches of the soil surface for 2 to 6 months during most years. The slope is less than 2 percent. These soils are fine-loamy, siliceous, hyperthermic Typic Glossaqualfs.

Winder soils are closely associated on the landscape with Basinger, Chobee, Felda, Myakka, Samsula, and Wabasso soils. Basinger and Myakka soils do not have an argillic horizon. Myakka and Wabasso soils have a spodic horizon. Chobee soils have a mollic epipedon. Felda soils have an argillic horizon at a depth of more than 20 inches. Samsula soils formed in organic materials.

Typical pedon of Winder fine sand; about 2.5 miles northwest of Clarkwild, 2,650 feet east and 2,200 feet north of the southwest corner of sec. 35, T. 27 S., R. 19 E.

A—0 to 4 inches; very dark gray (10YR 3/1) fine sand; moderate fine granular structure; friable; many fine and medium roots; neutral; clear smooth boundary.

E—4 to 10 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; common fine roots; mildly alkaline; gradual irregular boundary.

B/E—10 to 14 inches; dark grayish brown (10YR 4/2) sandy loam, (B); gray (10YR 5/1) fine sand, (E); common medium distinct light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) mottles; single grained; loose; common fine roots; mildly alkaline; clear wavy boundary.

Btg—14 to 30 inches; gray (10YR 6/1) sandy clay loam; weak coarse subangular blocky structure; slightly

sticky and slightly plastic; few fine roots; mildly alkaline; clear wavy boundary.

2Cg1—30 to 58 inches; light gray (5Y 6/1) sandy clay loam; common fine distinct white (10YR 8/1) and olive yellow (5Y 6/6) mottles; massive; slightly sticky and slightly plastic; friable; few fine roots; mildly alkaline; clear wavy boundary.

Cg2—58 to 80 inches; gray (5Y 5/1) sandy loam; massive; friable; mildly alkaline.

The thickness of the solum ranges from 22 to 60 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. Reaction ranges from medium acid to mildly alkaline.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. Reaction ranges from medium acid to mildly alkaline.

The B/E horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. The B part is sandy loam or sandy clay loam. Reaction ranges from medium acid to mildly alkaline. The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. Reaction ranges from neutral to moderately alkaline.

The 2Cg horizon has hue of 10YR to 5Y or 5GY, value of 4 to 8, and chroma of 1 to 8. In some pedons, this horizon contains fragments of shells. The texture is sand, fine sand, loamy sand, fine sandy loam, sandy loam, or sandy clay loam. Reaction is mildly alkaline or moderately alkaline.

Zolfo Series

The Zolfo series consists of deep, somewhat poorly drained soils. These soils formed in sandy marine sediment. They are on broad, low-lying ridges on the flatwoods. A seasonal high water table is at a depth of 24 to 40 inches for more than 2 to 6 months during most years. The slope is less than 2 percent. These soils are sandy, siliceous, hyperthermic Grossarenic Entic Haplohumods.

Zolfo soils are closely associated on the landscape with Malabar, Millhopper, Myakka, and Smyrna soils. Malabar and Millhopper soils have an argillic horizon. Smyrna and Myakka soils have a spodic horizon within 30 inches of the surface and are poorly drained.

Typical pedon of Zolfo fine sand; about 1.5 miles west of Lutz, 25 feet east and 75 feet south of the northwest corner of sec. 11, T. 27 S., R. 18 E.

Ap—0 to 3 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; many fine and medium roots; neutral; clear smooth boundary.

E1—3 to 15 inches; grayish brown (10YR 5/2) fine sand; common medium distinct light gray (10YR 7/1) and dark yellowish brown (10YR 4/4) mottles; single grained; loose; many fine and medium roots; neutral; clear smooth boundary.

E2—15 to 51 inches; light gray (10YR 7/2) fine sand; common fine distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6) mottles; single grained; loose; few fine and medium roots; neutral; gradual wavy boundary.

E3—51 to 60 inches; grayish brown (10YR 5/2) fine sand; single grained; nonsticky and nonplastic; neutral; gradual wavy boundary.

Bh1—60 to 65 inches; dark brown (7.5YR 4/2) fine sand; massive; very friable; organic matter coated sand grains; slightly acid; gradual smooth boundary.

Bh2—65 to 80 inches; dark brown (7.5YR 3/2) fine sand; weak fine granular structure; very friable; organic matter coated sand grains; slightly acid.

The thickness of the solum is 80 inches or more. The combined thickness of the A and E horizons ranges from 50 to 72 inches. Reaction ranges from very strongly acid to neutral in the A and E horizons and from extremely acid to slightly acid in the Bh horizon.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4.

The Bh horizon has hue of 10YR to 5YR, value of 2 to 4, and chroma of 1 to 3; or it is neutral and has value of 2 to 4.

Formation of the Soils

This section discusses the factors of soil formation, relates them to information of the soils in the survey area, and explains the processes of soil formation.

Factors of Soil Formation

The kind of soil that forms in a given area depends on five major factors. These factors are the climate under which the soil material has existed since accumulation; the physical and mineral composition of the parent material; the living organisms, or plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that these factors of soil formation have acted on the soil material.

The five factors of soil formation are interdependent; each modifies the effects of the others. As a soil forms, it is influenced by the five factors, but in some places one factor may have caused the major differences in the soils. A variation in one or more of the factors results in the formation of a different soil.

Climate

Hillsborough County has a subtropical climate. The soils in the county are in the hyperthermic temperature regime. In this regime, the average temperature of the soil at a depth of 20 inches (50 centimeters) is about 72 degrees Fahrenheit (22 degrees Celsius). The soils are never frozen; therefore, biological activity and chemical reactions involved in the soil formation processes continue throughout the year. These processes are also accelerated by the adequate supply of moisture that is available. The average annual rainfall is about 49 inches. Because of the warm, moist climate of Hillsborough County, organic matter decomposes rapidly, and chemical reaction in the soil is more rapid than in cooler, drier areas. Heavy rainfall leaches the soil of most plant nutrients and produces strongly acid soil conditions, especially in well drained to excessively drained sandy soils. Fine particles of clay and sometimes organic matter are carried downward, or translocated, and eventually form a subsoil.

The climate is fairly uniform throughout the county; therefore, climate has not been a major contributing factor to the differences among the soils. These differences are mainly the result of the other factors of soil formation.

Parent Material

The parent material of the soils in Hillsborough County consists mostly of deposits of marine origin. These deposits were mostly quartz sand and varying amounts of clay and shell fragments. Clay is more abundant in soils that formed in the sediment on marine terraces and in lagoons. Parent material was transported by sea waters, which covered the area a number of times during the Pleistocene age.

The parent materials in Hillsborough County differ somewhat in mineral and chemical composition and in physical constitution. The main physical differences, such as those between sand, silt, and clay, can be observed in the field. Other differences, such as mineral and chemical composition, are important to soil formation and affect present physical and chemical characteristics of the soils. Many differences among soils in the county reflect original differences in the parent materials as they were laid down.

Some organic soils are throughout the county. They formed in partly decayed remains of wetland vegetation.

Living Organisms

Plants and animals and micro-organisms, such as bacteria and fungi, are important in the formation of soils. Plants generally supply organic matter that decomposes, gives a dark color to the soil surface, and supplies the soil with nutrients. Trees and other plants take nutrients from the soil and store them in their roots, stems, leaves, and other parts. When these plants or plant parts decay, the nutrients are returned to the soil and can be used again. Bacteria and fungi decompose the vegetation and return the nutrients to the soil. In addition, many metabolic processes of the bacteria and fungi release organic acids and other materials that affect the process of soil formation. Earthworms, ants, and other animals mix the soil and influence porosity and other soil properties.

The native vegetation has had a major influence on soil genesis. Unless drastically disturbed by man, the soil and the natural vegetation show a close relationship, which is readily apparent in Hillsborough County. The very poorly drained soils are in the various swamp and marsh communities. Xerophytic communities of pines and oaks are on sand ridges, and pine-saw palmetto communities dominate the poorly drained soils on the

flatwoods. The natural relationship between the soil and the native plants is sometimes disturbed by human activities. Clearing, logging, and burning, for example, have disrupted the natural succession of plants in some areas.

Relief

Relief, or lay of the land, affects soil formation because it influences microclimate and water relationships. Soil temperature is influenced by altitude and by the orientation of slopes toward or away from the sun. Relief controls drainage, runoff, erosion, soil fertility, and vegetation. Soil formation is retarded on steeper slopes because soil material and organic matter tend to gravitate downslope.

Relief has a significant effect on the soils. Because the parent material of most of the soils in Hillsborough County was sandy marine deposits, the soils are sandy. Because sandy soils have low available water capacity and easily become droughty, most of the water available to plants comes from the water table. As a result, the depth to the water table becomes extremely important in determining the type of vegetation that grows in a particular area.

In addition, the depth to the water table affects internal drainage. On sand ridges, where the water table is deep and the soils are highly leached, soluble plant nutrients, colloidal clays, and organic matter are carried rapidly downward through the sandy soil.

In flatwood areas, the water table is commonly at or near the surface, and it rarely drops below 5 feet of the surface. Organic matter is translocated down a short distance and forms a humus-rich spodic horizon, or a Bh horizon. This horizon is locally referred to as a hardpan.

In low areas or depressions, where the water table is normally above the surface, muck accumulates under the marsh or swamp vegetation. As these plants die, the residue accumulates in water where oxygen is excluded, and it slowly and only partly decays. The amount of muck that accumulates depends mostly on the depth and duration of standing water. In some wet areas, accumulations of organic matter have formed a thick black topsoil on the mineral soil instead of a muck surface layer.

Time

Time is an important factor in soil formation. The physical and chemical changes brought about by climate, living organisms, and relief are slow. The length of time needed to convert raw geological material into soil varies according to the nature of the geologic material and the interaction of the other factors. Some basic minerals from which soils are formed weather fairly rapidly, while other minerals are chemically inert and show little change over long periods of time. The translocation of fine particles in the soil to form horizons is variable under different conditions, but the processes always take a relatively long period of time.

In Hillsborough County, the dominant geological material is inactive. The sands are almost pure quartz and are highly resistant to weathering. The finer textured silt and clay are the products of deposition or of earlier weathering.

Relatively little geologic time has elapsed since the material, in which the soils in Hillsborough County formed, was laid down or emerged from the sea. The age of a soil refers to the degrees of maturity of that soil, not to chronological or geological time. Because soils are influenced by the other four factors of soil formation, they mature at different rates. Immature soils, or soils that show little or any horizonation, may be on older landscapes than mature soils that show distinct horizonation. Examples of this situation are common throughout Hillsborough County.

In many areas in recent times, man's activity has become a major factor in soil genesis. The tilling of the soil and management practices used have altered the soil's structure, porosity, and other physical properties. The addition of lime, fertilizer, and other chemicals have altered chemical properties. Intensive use has sometimes caused removal of soil horizons through erosion. This process is often accompanied by increased deposition on flood plains and in depressions. In many places, a new soil, called Arents, has been created that does not have the normal diagnostic horizons attributed to natural soil-forming processes. Other areas, called Urban land, have been thoroughly covered or altered during construction of buildings, streets, or other structures. In some places, soils have been altered only to support activities on the surface. Little attention has been paid to the physical, chemical, and mineralogical properties of the underlying layers. Such neglect has often resulted in later problems that have been costly and difficult to remedy.

Processes of Horizon Differentiation

Soil morphology refers to that process which involves the formation of the soil horizon or soil horizon differentiation. The differentiation of horizons in soils in Hillsborough County is the result of accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals. Sometimes more than one of these processes is involved. Some organic matter has accumulated in the upper layers of most of the soils to form an A1 horizon. The quantity of organic matter is small in some of the soils and fairly large in others.

Leaching of carbonates and salts have occurred in all of the soils. Because the leaching permitted the subsequent translocation of silicate clay materials in some soils, the effects of leaching have been indirect.

Most of the soils in the county are leached to varying degrees.

Except in the excessively drained soils, the process of chemical reduction, or gleying, is evident in many of the soils in Hillsborough County. Gleying is caused by wetness. The gray matrix color in the B horizon in many soils and grayish mottles in some other soils indicate the reduction of iron. In some sandy soils, however, gray is the color of the sand grains. In some horizons, reddish brown mottles and concretions indicate the segregation of iron and a fluctuating water table.

The translocation of silicate clay, colloidal organic matter, and iron oxides has contributed to horizon development in many of the soils in the survey area. Movement of clay, organic matter, or iron is evident in many of the soils; for example, in a leached A2 horizon of light color, in a Bt or Bh horizon in which sand grains are bridged and coated with clay or colloidal organic matter, in a few patchy clay films on faces of peds, and in root channels. Other processes involved in soil formation, however, are less important in the formation of horizons in the soils in Hillsborough County than the translocation of silicate clays.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. Soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Aquifer. A layer or group of layers of geologic material (consolidated or unconsolidated) that contains sufficient saturated, permeable material to conduct ground water and to economically yield significant quantities of ground water to wells and springs.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). The volume of soft soil decreases excessively under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Confined aquifer. An aquifer bounded above and below by impermeable layers or by layers of distinctly lower permeability than that of the aquifer.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms. The Lco horizon is a limnic layer that contains many fecal pellets.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are

commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess humus (in tables). Too much organic matter for the intended use.

Excess lime (in tables). Excess carbonates in the soil restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil restrict the growth of most plants.

Excess sulfur (in tables). An excessive amount of sulfur is in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained

away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fill. Raising the surface level of the land to a desired level with suitable soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flatwoods. Broad, nearly level, low ridges of dominantly poorly drained soils characteristically vegetated with an open forest of pines and a ground cover of saw palmetto and pineland threeawn.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant that is not a grass or a sedge.

Formation (geological). A convenient geological unit of considerable thickness and lateral extent used in mapping, describing, or interpreting the geology of a region.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives as opposed to the range or geographical distribution.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics.

The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments that are 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor

aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mounding. Filling the area of the absorption field with suitable soil material to raise it above the water table to meet state and local regulations for proper functioning of septic tank absorption fields.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential climax vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables). Water is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sand tailings. Homogeneous sandy spoil material from mining operations.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slough. A broad, poorly defined drainageway subject to sheet flow during the rainy season.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium absorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^{++} + Mg^{++}$. The degrees of sodicity are—

	SAR
Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil blowing (in tables). Soil easily moved by wind.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, thickness of the line can be one fragment or more. It generally overlies material that weathered in place, and it is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsidence. The sinking of an organic soil to a lower level after lowering the water table.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too clayey (in tables). Soil slippery and sticky when wet and slow to dry.

Too sandy (in tables). Soil soft and loose; droughty and low in fertility.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unconfined aquifer. An aquifer that has a water table.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water control. To regulate the water table according to the need of the intended use by canals, ditches, tile, pumping, or any other appropriate method.

Water table (geologic). That surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere. Synonym: free-water surface; top of zone of saturation.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of course grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Based on data recorded in the period 1890-1983 at local weather stations and Tampa International Airport]

Month	Temperature					Precipitation	
	Normal monthly mean	Normal daily maximum	Normal daily minimum	Mean number of days with temperatures of-- 90 °F or higher	Mean number of days with temperatures of-- 32 °F or lower	Mean normal total 1951-1980	Mean number of days with rainfall of-- 0.01 inch or more
	°F	°F	°F			In	
January----	60.8	70.0	49.5	0	0	2.17	6
February---	62.0	71.0	50.4	0	0	3.04	7
March------	66.7	76.2	56.1	0	0	3.46	7
April------	71.5	81.9	61.1	1	0	1.82	5
May--------	76.9	87.1	67.2	7	0	3.38	6
June-------	80.7	89.5	72.3	15	0	5.29	12
July-------	81.9	90.0	74.2	20	0	7.35	16
August-----	82.0	90.3	74.2	20	0	7.64	17
September--	80.6	88.9	72.8	14	0	6.23	13
October----	74.6	83.7	65.1	2	0	2.34	7
November---	67.0	76.9	56.4	*	0	1.87	5
December---	61.9	71.6	50.9	0	0	2.14	7
Total----	72.2	81.4	62.5	79	0	46.73	107

* Less than one-half of a day.

TABLE 2.--AVERAGE COMPOSITION OF SELECTED MAP UNITS

[Average composition determined by Ground-Penetrating Radar (GPR) and other transect methods*]

Map symbol and soil name	Transects	Soils	Composition	Confidence interval**	Confidence level	Dissimilar soils	Composition
			Pct	Pct	Pct		Pct
2. Adamsville fine sand	11	Adamsville--- Similar soils	86 7	82-99	95	Lochloosa------- Pomello---------	6 1
3. Archbold fine sand	22	Archbold----- Similar soils	58 32	82-99	95	Other-----------	10
5. Basinger, Holopaw and Samsula soils, depressional	20	Basinger----- Holopaw------ Samsula------	35 31 18	78-96	90	Other-----------	16
7. Candler fine sand, 0 to 5 percent slopes	35	Candler------ Similar soils	75 14	82-96	95	Other----------- Millhopper------ Kendrick--------	8 2 1
8. Candler fine sand, 5 to 12 percent slopes	9	Candler------ Similar soils	68 26	82-99	80	Other----------- Millhopper------ Kendrick--------	2 2 2
10. Chobee loamy fine sand	8	Chobee------- Similar soils	79 17	88-99	95	Winder----------	4
11. Chobee muck, depressional	3	Chobee------- Similar soils	63 33	80-99	80	Felda-----------	4
12. Chobee sandy loam, frequently flooded	15	Chobee------- Similar soils	79 8	78-99	90	Felda----------- Wabasso---------	9 4
13. Eaton fine sand	4	Eaton-------- Similar soils	92 3	80-99	90	Wabasso---------	5
14. Eaton mucky sand, depressional	7	Eaton-------- Similar soils	68 16	78-99	80	Samsula--------- Wabasso---------	9 7
15. Felda fine sand	22	Felda-------- Similar soils	66 28	90-99	95	Pinellas-------- Wabasso---------	3 3
16. Felda fine sand, occasionally flooded	10	Felda-------- Similar soils	46 39	79-99	95	Basinger-------- Wabasso---------	8 7
17. Floridana fine sand	4	Floridana---- Similar soils	54 36	80-98	60	Samsula--------- Wabasso---------	6 4
18. Fort Meade loamy fine sand, 0 to 5 percent slopes	14	Fort Meade--- Similar soils	90 3	86-99	90	Millhopper------	7
19. Gainesville loamy fine sand, 0 to 5 percent slopes	10	Gainesville-- Similar soils	82 13	89-99	95	Millhopper------	5
21. Immokalee fine sand	12	Immokalee---- Similar soils	79 5	77-99	80	Wabasso--------- Ona-------------	9 7
23. Kendrick fine sand, 2 to 5 percent slopes	9	Kendrick----- Similar soils	46 44	84-99	95	Candler--------- Tavares---------	7 3

See footnotes at end of table.

TABLE 2.--AVERAGE COMPOSITION OF SELECTED MAP UNITS--Continued

Map symbol and soil name	Transects	Soils	Compo-sition	Confidence interval**	Confidence level	Dissimilar soils	Compo-sition
			Pct	Pct	Pct		Pct
24. Kesson muck, frequently flooded	5	Kesson-------	60	81-99	80	Myakka----------	7
		Similar soils	33				
25. Lake fine sand, 0 to 5 percent slopes	34	Lake---------	74	75-93	95	Millhopper------	9
		Similar soils	10			Tavares---------	4
26. Lochloosa-Micanopy fine sands, 0 to 5 percent slopes	12	Lochloosa----	28	97-99	95	Adamsville------	1
		Similar soils	23				
		Micanopy-----	48				
27. Malabar fine sand	9	Malabar------	83	79-92	80	Basinger--------	7
		Similar soils	3			Wabasso---------	1
29. Myakka fine sand	85	Myakka-------	32	84-93	95	Wabasso---------	9
30. Myakka fine sand, frequently flooded	6	Myakka-------	67	78-99	80	Other-----------	8
33. Ona fine sand	9	Ona----------	73	84-99	95	Basinger--------	2
		Similar soils	23			Immokalee-------	1
						Wabasso---------	1
35. Orlando fine sand, 0 to 5 percent slopes	5	Orlando------	87	92-99	95	Seffner---------	6
		Similar soils	6			Candler---------	1
36. Orsino fine sand, 0 to 5 percent slopes	11	Orsino-------	82	83-99	90	Immokalee-------	7
		Similar soils	5			Archbold--------	4
						Millhopper------	2
37. Paisley fine sand, depressional	6	Paisley------	92	82-99	80	Basinger--------	2
		Similar soils	4			Wabasso---------	2
38. Pinellas fine sand	11	Pinellas-----	88	83-99	90	Malabar---------	9
		Similar soils	2			Wabasso---------	1
41. Pomello fine sand, 0 to 5 percent slopes	24	Pomello------	51	75-99	95	Immokalee-------	8
		Similar soils	40			Smyrna----------	1
44. St. Augustine fine sand	4	St. Augustine	60	91-99	95	Kesson----------	4
		Similar soils	35			Myakka----------	1
46. St. Johns fine sand	16	St. Johns----	67	76-99	80	Basinger--------	6
		Similar soils	20			Other-----------	7
47. Seffner fine sand	9	Seffner------	74	84-99	95	Smyrna----------	5
		Similar soils	20			Ona-------------	1
52. Smyrna fine sand	11	Smyrna-------	35	90-99	95	Wabasso---------	2
		Similar soils	62			Pomello---------	1
53. Tavares-Millhopper fine sands, 0 to 5 percent slopes	14	Tavares------	50	87-99	95	Myakka----------	5
		Similar soils	13			Smyrna----------	4
		Millhopper---	15			Candler---------	2
		Similar soils	11				
54. Tavares-Millhopper fine sands, 5 to 8 percent slopes	9	Tavares------	70	78-99	80	Candler---------	3
		Millhopper---	21				
		Similar soils	6				

See footnotes at end of table.

TABLE 2.--AVERAGE COMPOSITION OF SELECTED MAP UNITS--Continued

Map symbol and soil name	Transects	Soils	Composition	Confidence interval**	Confidence level	Dissimilar soils	Composition
			Pct	Pct	Pct		Pct
60. Winder fine sand, frequently flooded	11	Winder-------	65	76-99	80	Samsula---------	10
		Similar soils	10			Basinger--------	8
						Chobee----------	7
61. Zolfo fine sand	19	Zolfo--------	71	88-99	95	Malabar---------	2
		Similar soils	23			Millhopper------	2
						Myakka----------	1
						Smyrna----------	1

* An example of transect data characterization at a specific confidence level reads: In 95 percent of the areas mapped as Pomello fine sand, 0 to 5 percent slopes, Pomello and similar soils will comprise 75 to 99 percent of the delineation. In the remaining 5 percent of the areas of this map unit, the percentage of Pomello and similar soils may be either higher than 99 percent or lower than 75 percent. Inversely, dissimilar soils make up 1 to 25 percent of most mapped areas.

** The confidence interval is the proportion of named plus similar soils at a given confidence level.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Adamsville fine sand	1,587	0.2
3	Archbold fine sand	8,071	1.2
4	Arents, nearly level	11,606	1.7
5	Basinger, Holopaw and Samsula soils, depressional	72,251	10.7
6	Broward-Urban land complex	317	0.1
7	Candler fine sand, 0 to 5 percent slopes	31,281	4.6
8	Candler fine sand, 5 to 12 percent slopes	1,135	0.2
9	Candler-Urban land complex, 0 to 5 percent slopes	18,504	2.8
10	Chobee loamy fine sand	1,399	0.2
11	Chobee muck, depressional	774	0.1
12	Chobee sandy loam, frequently flooded	14,682	2.2
13	Eaton fine sand	231	*
14	Eaton mucky sand, depressional	609	0.1
15	Felda fine sand	5,587	0.8
16	Felda fine sand, occasionally flooded	1,363	0.2
17	Floridana fine sand	938	0.1
18	Fort Meade loamy fine sand, 0 to 5 percent slopes	9,580	1.4
19	Gainesville loamy fine sand, 0 to 5 percent slopes	4,324	0.6
20	Gypsum land	519	0.1
21	Immokalee fine sand	16,883	2.5
22	Immokalee-Urban land complex	3,903	0.6
23	Kendrick fine sand, 2 to 5 percent slopes	400	0.1
24	Kesson muck, frequently flooded	6,015	0.9
25	Lake fine sand, 0 to 5 percent slopes	17,453	2.6
26	Lochloosa-Micanopy fine sands, 0 to 5 percent slopes	532	0.1
27	Malabar fine sand	29,794	4.4
28	Millhopper-Urban land complex, 0 to 5 percent slopes	848	0.1
29	Myakka fine sand	154,514	22.9
30	Myakka fine sand, frequently flooded	5,119	0.8
32	Myakka-Urban land complex	16,077	2.4
33	Ona fine sand	11,855	1.8
34	Ona-Urban land complex	1,408	0.2
35	Orlando fine sand, 0 to 5 percent slopes	2,236	0.3
36	Orsino fine sand, 0 to 5 percent slopes	936	0.1
37	Paisley fine sand, depressional	933	0.1
38	Pinellas fine sand	6,682	1.0
39	Arents, very steep	5,006	0.7
41	Pomello fine sand, 0 to 5 percent slopes	12,581	1.9
42	Pomello-Urban land complex, 0 to 5 percent slopes	1,541	0.2
43	Quartzipsamments, nearly level	2,444	0.4
44	St. Augustine fine sand	591	0.1
45	St. Augustine-Urban land complex	3,902	0.6
46	St. Johns fine sand	11,032	1.6
47	Seffner fine sand	17,031	2.5
50	Slickens	989	0.2
51	Haplaquents, clayey	5,487	0.8
52	Smyrna fine sand	14,683	2.2
53	Tavares-Millhopper fine sands, 0 to 5 percent slopes	8,755	1.3
54	Tavares-Millhopper fine sands, 5 to 8 percent slopes	491	0.1
55	Tavares-Urban land complex, 0 to 5 percent slopes	19,666	2.9
56	Urban land	14,094	2.1
57	Wabasso fine sand	7,575	1.1
58	Wabasso-Urban land complex	6,730	1.0
59	Winder fine sand	11,179	1.7
60	Winder fine sand, frequently flooded	25,104	3.7
61	Zolfo fine sand	43,583	6.5
	Water	1,020	0.2
	Total	673,830	100.0

* Less than 0.1 percent.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Tomatoes	Strawberries	Oranges	Grapefruit	Bahiagrass	Peppers
		25# Boxes	Flats	Boxes	Boxes	AUM*	Bu
2--------------- Adamsville	IIIw	---	---	375	500	7.0	---
3--------------- Archbold	VIs	---	---	400	525	5.5	---
4--------------- Arents	---	---	---	---	---	---	---
5--------------- Basinger, Holopaw and Samsula	VIIw	---	---	---	---	---	---
6--------------- Broward-Urban land	---	---	---	---	---	---	---
7--------------- Candler	IVs	---	1,700	425	625	7.0	1,200
8--------------- Candler	VIs	---	1,700	400	600	6.5	1,100
9--------------- Candler-Urban land	---	---	---	---	---	---	---
10-------------- Chobee	IIIw	---	---	---	---	---	---
11-------------- Chobee	VIIw	---	---	---	---	---	---
12-------------- Chobee	Vw	---	---	---	---	---	---
13-------------- Eaton	IIIw	1,000	125	---	---	10.0	---
14-------------- Eaton	VIIw	---	---	---	---	---	---
15-------------- Felda	IIIw	1,000	---	425	625	7.5	---
16-------------- Felda	IVw	---	---	---	---	---	---
17-------------- Floridana	IIIw	1,000	---	---	---	---	---
18-------------- Fort Meade	IIIs	---	2,000	600	750	9.0	1,500
19-------------- Gainesville	IIIs	---	---	500	700	9.0	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tomatoes	Strawberries	Oranges	Grapefruit	Bahiagrass	Peppers
		25# Boxes	Flats	Boxes	Boxes	AUM*	Bu
20--------------- Gypsum land	---	---	---	---	---	---	---
21--------------- Immokalee	IVw	1,800	1,800	350	550	---	1,400
22--------------- Immokalee-Urban land	---	---	---	---	---	---	---
23--------------- Kendrick	IIs	---	---	525	725	10.0	---
24--------------- Kesson	VIIIw	---	---	---	---	---	---
25--------------- Lake	IVs	---	1,700	500	700	4.5	1,200
26--------------- Lochloosa-Micanopy	IIw	---	---	475	675	10.0	---
27--------------- Malabar	IVw	13	---	325	575	---	1,300
28--------------- Millhopper-Urban land	---	---	---	---	---	---	---
29--------------- Myakka	IVw	1,800	1,800	350	550	9.0	1,400
30--------------- Myakka	VIIIw	---	---	---	---	---	---
32--------------- Myakka-Urban land	---	---	---	---	---	---	---
33--------------- Ona	IIIw	1,400	1,800	350	550	8.5	1,400
34--------------- Ona-Urban land	---	---	---	---	---	---	---
35--------------- Orlando	IIIs	---	2,000	500	700	9.0	1,500
36--------------- Orsino	IVs	---	---	350	450	5.0	---
37--------------- Paisley	VIIw	---	---	---	---	---	---
38--------------- Pinellas	IIIw	---	---	425	575	8.0	---
39--------------- Arents	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tomatoes	Strawberries	Oranges	Grapefruit	Bahiagrass	Peppers
		25# Boxes	Flats	Boxes	Boxes	AUM*	Bu
41--------------- Pomello	VIs	1,400	---	250	400	---	---
42--------------- Pomello-Urban land	---	---	---	---	---	---	---
43--------------- Quartzipsamments	---	---	---	---	---	---	---
44--------------- St. Augustine	VIIs	---	---	---	---	---	---
45--------------- St. Augustine-Urban land	---	---	---	---	---	---	---
46--------------- St. Johns	IIIw	1,400	1,800	300	550	8.5	1,400
47--------------- Seffner	IIIw	---	2,000	500	700	9.0	1,500
50--------------- Slickens	---	---	---	---	---	---	---
51--------------- Haplaquents	---	---	---	---	---	---	---
52--------------- Smyrna	IVw	1,800	1,800	350	550	8.0	1,400
53--------------- Tavares-Millhopper	IIIs	---	1,700	450	625	8.5	---
54--------------- Tavares-Millhopper	IVs	---	1,700	425	600	8.0	---
55--------------- Tavares-Urban land	---	---	---	---	---	---	---
56. Urban land							
57--------------- Wabasso	IIIw	1,500	---	400	575	8.0	1,400
58--------------- Wabasso-Urban land	---	---	---	---	---	---	---
59--------------- Winder	IIIw	1,000	---	---	---	9.0	---
60--------------- Winder	Vw	---	---	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tomatoes	Strawberries	Oranges	Grapefruit	Bahiagrass	Peppers
		25# Boxes	Flats	Boxes	Boxes	AUM*	Bu
61--------------- Zolfo	IIIw	---	1,700	375	500	7.0	1,300

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 5.--RANGELAND PRODUCTIVITY

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Map symbol and soil name	Range site	Potential annual production for kind of growing season: Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
2 Adamsville	Oak Hammocks	3,500	3,000	2,000
3 Archbold	Sand Pine-Scrub Oak	3,500	2,500	1,500
5 Basinger-Holopaw-Samsula	Freshwater Marshes and Ponds	10,000	7,500	5,000
7, 8 Candler	Longleaf Pine-Turkey Oak Hills	4,000	3,000	2,000
11 Chobee	Freshwater Marshes and Ponds	10,000	7,500	5,000
12 Chobee	Freshwater Marshes and Ponds	10,000	7,500	5,000
15 Felda	Slough	8,000	6,000	4,000
16 Felda	Freshwater Marshes and Ponds	10,000	7,500	5,000
18 Fort Meade	Upland Hardwood Hammocks	4,500	3,500	3,000
19 Gainesville	Upland Hardwood Hammocks	4,500	3,500	3,000
21 Immokalee	South Florida Flatwoods	6,000	4,500	3,000
23 Kendrick	Upland Hardwood Hammocks	4,500	3,500	3,000
24 Kesson	Saltwater Marsh	8,000	6,000	4,000
25 Lake	Longleaf Pine-Turkey Oak Hills	4,000	3,000	2,000
26 Lochloosa-Micanopy	Upland Hardwood Hammocks	4,500	3,500	3,000
27 Malabar	Slough	8,000	6,000	4,000
29 Myakka	South Florida Flatwoods	6,000	4,500	3,000
30 Myakka	Saltwater Marsh	8,000	6,000	4,000
33 Ona	South Florida Flatwoods	6,000	4,500	3,000

TABLE 5.--RANGELAND PRODUCTIVITY--Continued

Map symbol and soil name	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
35: Orlando	Longleaf Pine-Turkey Oak Hills	4,000	3,000	2,000
36: Orsino	Sand Pine Scrub	3,500	2,500	1,500
37: Paisley	Freshwater Marshes and Ponds	10,000	7,500	5,000
38: Pinellas	Cabbage Palm Flatwoods	9,000	6,500	4,500
41: Pomello	Sand Pine Scrub	3,500	2,000	1,500
46: St. Johns	South Florida Flatwoods	6,000	4,500	3,000
47: Seffner	Oak Hammocks	3,500	3,000	2,000
52: Smyrna	South Florida Flatwoods	6,000	4,500	3,000
53, 54: Tavares-Millhopper	Longleaf Pine-Turkey Oak Hills	4,000	3,000	2,000
57: Wabasso	South Florida Flatwoods	6,000	4,500	3,000
59: Winder	Cabbage Palm Hammocks	4,000	3,000	2,000
61: Zolfo	Upland Hardwood Hammocks	4,500	3,500	3,000

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
2------------------ Adamsville	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Longleaf pine-------	65	5	
							Laurel oak----------	---	---	
							Water oak-----------	---	---	
							Live oak------------	---	---	
							Hickory-------------	---	---	
							Black cherry--------	---	---	
3------------------ Archbold	3S	Slight	Severe	Moderate	Slight	Slight	Sand pine-----------	60	3	Sand pine.
5**:										
Basinger-----------	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress***------	75	2	
							Baldcypress---------	---	---	
							Pond pine-----------	---	---	
							Blackgum------------	---	---	
							Cabbage palm--------	---	---	
							Carolina ash--------	---	---	
							Loblollybay gordonia	---	---	
							Red maple-----------	---	---	
							Sweetbay------------	---	---	
Holopaw------------	2W	Slight	Severe	Severe	Moderate	---------	Pondcypress***------	75	2	
							Baldcypress---------	---	---	
							Blackgum------------	---	---	
							Cabbage palm--------	---	---	
							Carolina ash--------	---	---	
							Loblollybay gordonia	---	---	
							Pond pine-----------	---	---	
							Red maple-----------	---	---	
							Sweetbay------------	---	---	
7, 8--------------- Candler	8S	Slight	Moderate	Moderate	Slight	Moderate	Sand pine-----------	75	4	Sand pine.
							Slash pine----------	70	8	
							Longleaf pine-------	60	4	
							Turkey oak----------	---	---	
10----------------- Chobee	11W	Slight	Severe	Moderate	Slight	Severe	Slash pine----------	90	11	Slash pine.
							Longleaf pine-------	70	6	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
11**: Chobee	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress***	75	2	
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Carolina ash	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							Pond pine	---	---	
							Sweetgum	---	---	
12**: Chobee	6W	Slight	Severe	Moderate	Slight	Severe	Baldcypress	100	6	
							Red maple	---	---	
							Sweetgum	---	---	
							Blackgum	---	---	
13: Eaton	11W	Slight	Severe	Moderate	Slight	Moderate	Slash pine	90	11	Slash pine.
							Loblolly pine	90	9	
							Longleaf pine	80	7	
							Magnolia	---	---	
							Water oak	---	---	
							Sweetgum	---	---	
14**: Eaton	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress***	75	2	
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Carolina ash	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							Pond pine	---	---	
							Sweetgum	---	---	
15, 16: Felda	10W	Slight	Moderate	Severe	Slight	Moderate	Slash pine	80	10	Slash pine.
							Longleaf pine	65	5	
17: Floridana	11W	Slight	Severe	Severe	Slight	Moderate	Slash pine	90	11	Slash pine.
							Longleaf pine	75	6	
							Cabbage palm	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
18----------------- Fort Meade	10S	Slight	Slight	Slight	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Loblolly pine-------	80	8	
							Longleaf pine-------	70	6	
							Redosier dogwood----	---	---	
							Southern magnolia---	---	---	
							Laurel oak----------	---	---	
							Live oak------------	---	---	
							Post oak------------	---	---	
							Turkey oak----------	---	---	
							Hickory-------------	---	---	
							Cabbage palm--------	---	---	
19----------------- Gainesville	10S	Slight	Slight	Slight	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Loblolly pine-------	80	8	
							Longleaf pine-------	70	6	
							Magnolia------------	---	---	
							Maple---------------	---	---	
							Dogwood-------------	---	---	
							Live oak------------	---	---	
							Water oak-----------	---	---	
							Laurel oak----------	---	---	
21----------------- Immokalee	8W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine----------	70	8	Slash pine.
							Longleaf pine-------	65	5	
23----------------- Kendrick	11S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	90	11	Slash pine, loblolly pine.
							Loblolly pine-------	90	9	
							Longleaf pine-------	75	6	
							Turkey oak----------	---	---	
							Hickory-------------	---	---	
							Magnolia------------	---	---	
25----------------- Lake	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Longleaf pine-------	65	5	
							Blackjack oak-------	---	---	
							Bluejack oak--------	---	---	
							Turkey oak----------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
26:										
Lochloosa	11A	Slight	Slight	Slight	Slight	Slight	Slash pine	90	11	Slash pine, loblolly pine.
							Loblolly pine	90	9	
							Dogwood	---	---	
							Hickory	---	---	
							Live oak	---	---	
							Laurel oak	---	---	
							Water oak	---	---	
							Magnolia	---	---	
							Sweetgum	---	---	
							Red maple	---	---	
Micanopy	11A	Slight	Slight	Slight	Slight	Slight	Slash pine	90	11	Slash pine.
							Loblolly pine	90	9	
							Longleaf pine	75	6	
							Magnolia	---	---	
							Hickory	---	---	
							Dogwood	---	---	
							Laurel oak	---	---	
							Live oak	---	---	
							Water oak	---	---	
27 Malabar	10W	Slight	Moderate	Severe	Slight	Moderate	Slash pine	80	10	Slash pine.
							Longleaf pine	70	6	
							Cabbage palm	---	---	
							Live oak	---	---	
							Water oak	---	---	
							Laurel oak	---	---	
29 Myakka	8W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine	70	8	Slash pine.
							Longleaf pine	60	4	
33 Ona	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slash pine.
							Longleaf pine	70	6	
35 Orlando	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slash pine.
							Longleaf pine	65	5	
							Laurel oak	---	---	
							Live oak	---	---	
							Turkey oak	---	---	
							Dogwood	---	---	
							Hickory	---	---	
							Sweetbay	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
36----------------- Orsino	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine----------	70	8	Slash pine, sand pine.
							Longleaf pine-------	60	4	
							Sand pine-----------	70	4	
							Sand live oak-------	---	---	
							Turkey oak----------	---	---	
37----------------- Paisley	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress***------	75	2	
							Baldcypress---------	---	---	
							Blackgum------------	---	---	
							Cabbage palm--------	---	---	
							Pond pine-----------	---	---	
							Loblollybay gordonia	---	---	
							Red maple-----------	---	---	
							Sweetbay------------	---	---	
38----------------- Pinellas	8W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine----------	70	8	Slash pine.
							Longleaf pine-------	60	4	
41----------------- Pomello	8S	Slight	Moderate	Severe	Moderate	Moderate	Sand pine-----------	60	3	Sand pine, slash pine.
							Slash pine----------	70	8	
							Longleaf pine-------	60	4	
46----------------- St. Johns	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Longleaf pine-------	70	6	
47----------------- Seffner	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	
							Longleaf pine-------	70	6	
							Live oak------------	80	---	
52----------------- Smyrna	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Longleaf pine-------	70	6	
53, 54:										
Tavares-----------	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Longleaf pine-------	70	6	
							Turkey oak----------	---	---	
							Bluejack oak--------	---	---	
Millhopper--------	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Loblolly pine-------	80	8	
							Longleaf pine-------	65	5	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
57 Wabasso	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slash pine, loblolly pine.
							Longleaf pine	65	5	
							Loblolly pine	80	8	
							Live oak	---	---	
							Water oak	---	---	
59, 60 Winder	11W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine	90	11	Slash pine.
61 Zolfo	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slash pine.
							Longleaf pine	65	5	
							Turkey oak	---	---	
							Laurel oak	---	---	
							Water oak	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** Generally not suited to the production of pine trees because of ponding or prolonged wetness. They may be suited to cypress and hardwood production through natural regeneration.

*** Site index is estimated.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2. Adamsville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
3. Archbold	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
4. Arents					
5:					
Basinger	Severe: ponding.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Holopaw	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
Samsula	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
6:					
Broward	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
7. Candler	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
8. Candler	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
9:					
Candler	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
10. Chobee	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
11. Chobee	Severe: ponding, percs slowly, excess humus.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, percs slowly.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
12. Chobee	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, flooding, percs slowly.	Severe: wetness.	Severe: wetness, flooding.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
13-------------------- Eaton	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
14-------------------- Eaton	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
15-------------------- Felda	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
16-------------------- Felda	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
17-------------------- Floridana	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness.
18-------------------- Fort Meade	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
19-------------------- Gainesville	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
20. Gypsum land					
21-------------------- Immokalee	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
22:					
Immokalee------------	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Urban land.					
23-------------------- Kendrick	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
24-------------------- Kesson	Severe: flooding, wetness.	Severe: wetness, excess salt.	Severe: wetness, flooding.	Severe: wetness.	Severe: excess salt, flooding, wetness.
25-------------------- Lake	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
26:					
Lochloosa------------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Slight.
Micanopy-------------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
27 Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
28: Millhopper	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Urban land.					
29 Myakka	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
30 Myakka	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: flooding, wetness, too sandy.	Severe: excess salt, wetness, flooding.
32: Myakka	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.					
33 Ona	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
34: Ona	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.					
35 Orlando	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
36 Orsino	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
37 Paisley	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
38 Pinellas	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
39. Arents					
41 Pomello	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
42:					
Pomello	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
43. Quartzipsamments					
44 St. Augustine	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
45:					
St. Augustine	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
46 St. Johns	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
47 Seffner	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty.
50. Slickens					
51. Haplaquents					
52 Smyrna	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
53:					
Tavares	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Millhopper	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
54:					
Tavares	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
Millhopper	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, slope.	Severe: too sandy.	Moderate: droughty.
55:					
Tavares	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
56. Urban land					
57 Wabasso	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness.
58:					
Wabasso	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.					
59 Winder	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness.
60 Winder	Severe: flooding, wetness, percs slowly.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, flooding.
61 Zolfo	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2: Adamsville	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor.
3: Archbold	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
4. Arents										
5:										
Basinger	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Holopaw	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Samsula	Very poor.	Very poor.	Poor	Fair	Very poor.	Good	Good	Very poor.	Poor	Good.
6:										
Broward	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor.
Urban land.										
7, 8: Candler	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
9:										
Candler	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Urban land.										
10: Chobee	Poor	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good.
11: Chobee	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Good	Good	Very poor.	Poor	Good.
12: Chobee	Poor	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good.
13: Eaton	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.
14: Eaton	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
15, 16: Felda	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair.
17: Floridana	Poor	Poor	Fair	Poor	Poor	Good	Good	Poor	Poor	Good.
18: Fort Meade	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
19----------------- Gainesville	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
20. Gypsum land										
21----------------- Immokalee	Poor	Poor	Fair	Poor	Poor	Fair	Poor	Poor	Poor	Poor.
22:										
Immokalee---------	Poor	Poor	Fair	Poor	Poor	Fair	Poor	Poor	Poor	Poor.
Urban land.										
23----------------- Kendrick	Fair	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Very poor.
24----------------- Kesson	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Fair.
25----------------- Lake	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
26:										
Lochloosa---------	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Micanopy----------	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
27----------------- Malabar	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
28:										
Millhopper--------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Urban land.										
29----------------- Myakka	Poor	Fair	Fair	Poor	Poor	Fair	Poor	Fair	Poor	Poor.
30----------------- Myakka	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Fair.
32:										
Myakka------------	Poor	Fair	Fair	Poor	Poor	Fair	Poor	Fair	Poor	Poor.
Urban land.										
33----------------- Ona	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
34:										
Ona---------------	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
Urban land.										
35----------------- Orlando	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
36----------------- Orsino	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
37----------------- Paisley	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.
38----------------- Pinellas	Very poor.	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
39. Arents										
41----------------- Pomello	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
42: Pomello------------	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Urban land.										
43. Quartzipsamments										
44----------------- St. Augustine	Very poor.	Very poor.	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor.
45: St. Augustine-----	Very poor.	Very poor.	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor.
Urban land.										
46----------------- St. Johns	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
47----------------- Seffner	Poor	Poor	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
50. Slickens										
51. Haplaquents										
52----------------- Smyrna	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
53, 54: Tavares------------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Millhopper---------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
55: Tavares------------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
55:										
Urban land.										
56.										
Urban land										
57----------------- Wabasso	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair	Poor.
58:										
Wabasso-----------	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair	Poor.
Urban land.										
59, 60------------- Winder	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
61----------------- Zolfo	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2----------------- Adamsville	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty, too sandy.
3----------------- Archbold	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
4. Arents						
5:						
Basinger---------	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Holopaw----------	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
Samsula----------	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
6:						
Broward----------	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
Urban land.						
7----------------- Candler	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.
8----------------- Candler	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
9:						
Candler----------	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.
Urban land.						
10---------------- Chobee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
11---------------- Chobee	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
12---------------- Chobee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
13 Eaton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
14 Eaton	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
15 Felda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
16 Felda	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty.
17 Floridana	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
18 Fort Meade	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
19 Gainesville	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
20. Gypsum land						
21 Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
22: Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Urban land.						
23 Kendrick	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
24 Kesson	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, flooding, wetness.
25 Lake	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
26: Lochloosa	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Slight.
Micanopy	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
27------------- Malabar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
28:						
Millhopper-------	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
Urban land.						
29------------- Myakka	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
30------------- Myakka	Severe: cutbanks cave, wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
32:						
Myakka-----------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
33------------- Ona	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
34:						
Ona--------------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
35------------- Orlando	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty, too sandy.
36------------- Orsino	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
37------------- Paisley	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
38------------- Pinellas	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
39: Arents.						
41------------- Pomello	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
42:						
Pomello	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
Urban land.						
43. Quartzipsamments						
44 St. Augustine	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: droughty.
45:						
St. Augustine	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: droughty.
Urban land.						
46 St. Johns	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
47 Seffner	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
50. Slickens						
51. Haplaquents						
52 Smyrna	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
53:						
Tavares	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
Millhopper	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
54:						
Tavares	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Severe: droughty.
Millhopper	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Moderate: droughty.
55:						
Tavares	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
Urban land.						
56. Urban land						

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
57 Wabasso	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
58:						
Wabasso	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
59 Winder	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
60 Winder	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.
61 Zolfo	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty, too sandy.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2 Adamsville	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
3 Archbold	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
4. Arents					
5: Basinger	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Holopaw	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Samsula	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
6: Broward	Severe: depth to rock, wetness, poor filter.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, seepage, wetness.	Poor: depth to rock, seepage, too sandy.
Urban land.					
7 Candler	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
8 Candler	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
9: Candler	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Urban land.					
10 Chobee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
11------------------ Chobee	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, ponding.
12------------------ Chobee	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
13------------------ Eaton	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
14------------------ Eaton	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: ponding, too clayey.	Severe: seepage, ponding.	Poor: too clayey, hard to pack, ponding.
15------------------ Felda	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
16------------------ Felda	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
17------------------ Floridana	Severe: wetness, percs slowly, poor filter.	Severe: wetness, seepage.	Severe: wetness.	Severe: wetness, seepage.	Poor: wetness.
18------------------ Fort Meade	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
19------------------ Gainesville	Slight-----------	Severe: seepage.	Moderate: too sandy.	Severe: seepage.	Fair: too sandy.
20. Gypsum land					
21------------------ Immokalee	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
22: Immokalee----------	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
23------------------ Kendrick	Slight-----------	Severe: seepage.	Slight-----------	Severe: seepage.	Good.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
24----------------- Kesson	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
25----------------- Lake	Slight-----------	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
26:					
Lochloosa----------	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Micanopy-----------	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness, too clayey.	Severe: seepage.	Poor: too clayey, hard to pack.
27----------------- Malabar	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
28:					
Millhopper---------	Moderate: wetness.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Urban land.					
29----------------- Myakka	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
30----------------- Myakka	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
32:					
Myakka-------------	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
33----------------- Ona	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
34:					
Ona----------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
35----------------- Orlando	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Severe: seepage, too sandy.
36----------------- Orsino	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
37----------------- Paisley	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
38----------------- Pinellas	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
39: Arents.					
41----------------- Pomello	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
42: Pomello------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Urban land.					
43. Quartzipsamments					
44----------------- St. Augustine	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
45: St. Augustine------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Urban land.					
46----------------- St. Johns	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
47. Seffner	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
50. Slickens					
51. Haplaquents					
52. Smyrna	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
53, 54:					
Tavares	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Millhopper	Moderate: wetness.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
55:					
Tavares	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Urban land.					
56. Urban land					
57. Wabasso	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
58:					
Wabasso	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
59. Winder	Severe: percs slowly, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness, thin layer.
60. Winder	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, thin layer.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
61------------------ Zolfo	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
2--------------------- Adamsville	Fair: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy.
3--------------------- Archbold	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
4. Arents				
5:				
Basinger-------------	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
Holopaw--------------	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
Samsula--------------	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: excess humus, wetness.
6:				
Broward--------------	Poor: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
Urban land.				
7, 8----------------- Candler	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
9:				
Candler--------------	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
Urban land.				
10-------------------- Chobee	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: wetness.
11-------------------- Chobee	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: excess humus, wetness.
12-------------------- Chobee	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: wetness.
13-------------------- Eaton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
14-------------------- Eaton	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
15, 16: Felda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
17: Floridana	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
18: Fort Meade	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
19: Gainesville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
20. Gypsum land				
21: Immokalee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
22:				
Immokalee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
23: Kendrick	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
24: Kesson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess salt, wetness.
25: Lake	Good	Probable	Improbable: too sandy.	Poor: too sandy.
26:				
Lochloosa	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Micanopy	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
27: Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
28:				
Millhopper	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
29: Myakka	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
30-------------------- Myakka	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, excess salt, wetness.
32:				
Myakka---------------	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
33-------------------- Ona	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
34:				
Ona------------------	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
35-------------------- Orlando	Slight---------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
36-------------------- Orsino	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
37-------------------- Paisley	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
38-------------------- Pinellas	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
39: Arents.				
41-------------------- Pomello	Fair: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy.
42:				
Pomello--------------	Fair: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy.
Urban land.				
43. Quartzipsamments				
44-------------------- St. Augustine	Fair: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy.
45:				
St. Augustine--------	Fair: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
45:				
Urban land.				
46	Poor:	Probable	Improbable:	Poor:
St. Johns	wetness.		too sandy.	too sandy, wetness.
47	Fair:	Probable	Improbable:	Poor:
Seffner	wetness.		too sandy.	too sandy.
50.				
Slickens				
51.				
Haplaquents				
52	Poor:	Probable	Improbable:	Poor:
Smyrna	wetness.		too sandy.	too sandy, wetness.
53, 54:				
Tavares	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Millhopper	Good	Probable	Improbable: too sandy.	Poor: too sandy.
55:				
Tavares	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
56.				
Urban land				
57	Poor:	Probable	Improbable:	Poor:
Wabasso	wetness.		too sandy.	too sandy, wetness.
58:				
Wabasso	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
59	Poor:	Probable	Improbable:	Poor:
Winder	wetness.		excess fines.	too sandy, wetness.
60	Poor:	Probable	Improbable:	Poor:
Winder	wetness.		excess fines.	too sandy, wetness.
61	Fair:	Probable	Improbable:	Poor:
Zolfo	wetness.		too sandy.	too sandy.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Grassed waterways
2----------------- Adamsville	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
3----------------- Archbold	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
4. Arents						
5:						
Basinger----------	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
Holopaw----------	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
Samsula----------	Severe: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, subsides.	Ponding, soil blowing.	Wetness.
6:						
Broward----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Droughty, depth to rock.
Urban land.						
7----------------- Candler	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
8----------------- Candler	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Slope, droughty.
9:						
Candler----------	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
Urban land.						
10---------------- Chobee	Slight---------	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly---		Wetness, rooting depth, percs slowly.
11---------------- Chobee	Moderate: seepage.	Severe: ponding, piping, seepage.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
12 Chobee	Slight	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, soil blowing.	Wetness, rooting depth, percs slowly.
13 Eaton	Severe: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly	Wetness, droughty, fast intake.	Wetness, droughty, percs slowly.
14 Eaton	Severe: seepage.	Severe: ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, droughty, fast intake.	Wetness, droughty, percs slowly.
15 Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
16 Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
17 Floridana	Severe: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly	Wetness, fast intake.	Wetness, percs slowly.
18 Fort Meade	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
19 Gainesville	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
20. Gypsum land						
21 Immokalee	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
22: Immokalee	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Urban land.						
23 Kendrick	Severe: seepage.	Slight	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty, rooting depth.
24 Kesson	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, excess salt.	Wetness, excess salt, droughty.
25 Lake	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
26:						
Lochloosa	Severe: seepage.	Moderate: wetness.	Severe: cutbanks cave.	Favorable	Wetness, fast intake, soil blowing.	Favorable.
Micanopy	Slight	Severe: hard to pack.	Severe: no water.	Percs slowly	Wetness, fast intake, soil blowing.	Percs slowly.
27 Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
28:						
Millhopper	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
Urban land.						
29 Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
30 Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, droughty, fast intake.	Wetness, excess salt, droughty.
32:						
Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Urban land.						
33 Ona	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
34:						
Ona	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Urban land.						
35 Orlando	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
36 Orsino	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
37 Paisley	Slight	Severe: ponding.	Severe: slow refill.	Ponding, percs slowly.	Ponding, fast intake, soil blowing.	Wetness, percs slowly.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
38 Pinellas	Severe: seepage.	Severe: seepage, piping, wetness.	Moderate: slow refill.	Favorable	Wetness, droughty, fast intake.	Wetness.
39: Arents.						
41 Pomello	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
42: Pomello	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
Urban land.						
43. Quartzipsamments						
44 St. Augustine	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
45: St. Augustine	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
Urban land.						
46 St. Johns	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Wetness, cutbanks cave.	Wetness, droughty, fast intake.	Wetness.
47 Seffner	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
50. Slickens						
51. Haplaquents						
52 Smyrna	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
53, 54: Tavares	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
53, 54:						
Millhopper	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
55:						
Tavares	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
Urban land.						
56. Urban land						
57 Wabasso	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, rooting depth.
58:						
Wabasso	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, rooting depth.
Urban land.						
59 Winder	Moderate: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly	Wetness, droughty, fast intake.	Wetness, droughty, percs slowly.
60 Winder	Moderate: seepage.	Severe: seepage, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, droughty, fast intake.	Wetness, droughty, percs slowly.
61 Zolfo	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
2---------------- Adamsville	0-6	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	6-80	Fine sand, sand	SP-SM, SP	A-3, A-2-4	0	100	100	90-100	2-12	---	NP
3---------------- Archbold	0-4	Fine sand--------	SP	A-3	0	100	100	89-99	1-3	---	NP
	4-80	Sand, fine sand	SP	A-3	0	100	100	89-99	1-3	---	NP
4. Arents											
5:											
Basinger---------	0-7	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	7-28	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	28-42	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	42-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
Holopaw----------	0-6	Mucky fine sand	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	6-52	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	52-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC	A-2-4	0	100	95-100	70-95	15-30	<25	NP-7
Samsula----------	0-34	Muck-------------	PT	---	---	---	---	---	---	---	---
	34-80	Sand, fine sand, loamy sand.	SP-SM, SM, SP	A-3, A-2-4	0	100	100	80-100	2-20	---	NP
6:											
Broward----------	0-4	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	4-26	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	26-80	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
7---------------- Candler	0-6	Fine sand--------	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	6-72	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	72-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	95-100	75-100	5-12	---	NP
8---------------- Candler	0-6	Fine sand--------	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	6-74	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	74-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	95-100	75-100	5-12	---	NP
9:											
Candler----------	0-6	Fine sand--------	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	6-76	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	76-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	95-100	75-100	5-12	---	NP
Urban land.											

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
10--------------- Chobee	0-16	Loamy fine sand	SP-SM, SM	A-2-4	0	100	100	80-99	12-25	<40	NP-10
	16-49	Sandy clay loam	SC	A-2-6, A-2-7, A-6, A-7	0	100	100	85-99	25-45	35-45	20-25
	49-80	Loamy sand, fine sand, sandy clay loam.	SP-SM, SM, SC, SM-SC	A-2-4, A-2-6, A-6, A-7	0	100	100	80-99	12-45	<45	NP-25
11--------------- Chobee	0-4	Muck--------------	PT	---	0	---	---	---	---	---	---
	4-12	Loamy fine sand	SP-SM, SM	A-2-4	0	100	100	80-100	12-25	<40	NP-10
	12-49	Sandy loam, fine sandy loam, sandy clay loam.	SP-SM, SM, SC, SM-SC	A-2-4, A-2-6, A-6, A-7	0	100	100	85-100	12-45	<45	NP-25
	49-80	Fine sand, loamy sand.	SP-SM, SM	A-2-4	0	100	100	80-100	12-25	<40	NP-10
12--------------- Chobee	0-15	Sandy loam--------	SP-SM, SM	A-2-4	0	100	100	85-99	12-25	<40	NP-10
	15-60	Sandy clay loam	SC	A-2-6, A-2-7, A-6, A-7	0	100	100	85-99	25-45	35-45	20-25
	60-80	Loamy sand, fine sand, sandy clay loam.	SP-SM, SM, SC, SM-SC	A-2-4, A-2-6, A-6, A-7	0	100	100	80-99	12-45	<45	NP-25
13--------------- Eaton	0-22	Fine sand---------	SP-SM	A-3, A-2-4	0	100	95-100	75-99	5-12	---	NP
	22-80	Sandy clay, clay	SC, CL, CH	A-6, A-7	0	100	95-100	90-100	45-65	35-55	20-40
14--------------- Eaton	0-8	Mucky sand--------	SP-SM	A-3, A-2-4	0	100	95-100	75-99	5-12	---	NP
	8-22	Fine sand, sand, loamy sand.	SM, SP-SM	A-2-4, A-3	0	100	95-100	75-99	5-20	---	NP
	22-80	Sandy clay, clay	SC, CL, CH	A-7	0	100	95-100	90-100	45-65	45-65	20-40
15--------------- Felda	0-22	Fine sand---------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	22-45	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	45-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
16--------------- Felda	0-22	Fine sand---------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	22-38	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	38-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
17--------------- Floridana	0-12	Fine sand---------	SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-25	---	NP
	12-28	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	28-60	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-95	20-35	20-45	4-28
	60-80	Variable----------	---	---	---	---	---	---	---	---	---
18--------------- Fort Meade	0-26	Loamy fine sand	SM	A-2-4	0	95-100	90-100	80-100	13-25	---	NP
	26-80	Loamy sand, loamy fine sand, fine sand.	SM	A-2-4	0	95-100	90-100	80-100	13-25	---	NP

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
19---------------- Gainesville	0-80	Loamy fine sand	SM	A-2-4	0	97-100	95-100	85-100	13-28	---	NP
20. Gypsum land											
21---------------- Immokalee	0-8	Fine sand--------	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	8-36	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	36-80	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-21	---	NP
22: Immokalee--------	0-5	Fine sand--------	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	5-35	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	35-60	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-21	---	NP
	60-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
Urban land.											
23---------------- Kendrick	0-35	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	75-100	5-19	---	NP
	35-68	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC	A-2-6, A-2-4	0	95-100	90-100	85-100	25-35	20-35	4-18
	68-80	Sandy clay loam, sandy clay.	SC	A-2-6, A-6	0	95-100	90-100	85-100	25-45	25-40	9-20
24---------------- Kesson	0-5	Muck-------------	PT	---	0	---	---	---	---	---	NP
	5-80	Sand, fine sand	SP, SP-SM	A-3	0	90-100	90-100	90-100	2-10	---	NP
25---------------- Lake	0-80	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-98	5-12	---	NP
26: Lochloosa--------	0-28	Fine sand--------	SP-SM, SM	A-2-4, A-3	0	95-100	95-100	90-98	8-20	---	NP
	28-35	Fine sandy loam, sandy loam, loamy sand.	SM, SM-SC	A-2-4	0	95-100	95-100	90-98	18-30	<28	NP-6
	35-69	Sandy clay loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	95-100	95-100	90-98	25-40	25-40	5-18
	69-80	Sandy clay loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	95-100	95-100	90-98	25-40	25-40	5-18
Micanopy---------	0-15	Fine sand--------	SM, SP-SM	A-2-4	0	95-100	95-100	90-100	11-25	---	NP
	15-25	Sandy clay, sandy clay loam.	SC	A-2, A-6, A-7	0	95-100	95-100	90-100	30-50	25-45	12-25
	25-59	Sandy clay, clay	CH	A-7	0	95-100	95-100	90-100	51-70	51-75	25-45
	59-80	Sandy clay, sandy clay loam.	CH, SC	A-7, A-6	0	95-100	95-100	90-100	45-55	35-70	17-42
27---------------- Malabar	0-12	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	12-30	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	30-50	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	50-66	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	80-100	20-40	<35	NP-20
	66-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
28:											
Millhopper------	0-57	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	97-100	75-95	5-20	---	NP
	57-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-4	0	100	97-100	75-95	18-40	<28	NP-10
Urban land.											
29--------------- Myakka	0-20	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	20-30	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	30-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
30--------------- Myakka	0-22	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	22-40	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	40-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
32:											
Myakka----------	0-20	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	20-44	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	44-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
Urban land.											
33--------------- Ona	0-4	Fine sand--------	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
	4-22	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-20	---	NP
	22-80	Fine sand, sand	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
34:											
Ona-------------	0-4	Fine sand--------	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
	4-18	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-20	---	NP
	18-80	Fine sand, sand	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
Urban land.											
35--------------- Orlando	0-20	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	1-12	---	NP
	20-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	1-12	---	NP
36--------------- Orsino	0-31	Fine sand--------	SP	A-3	0	100	100	85-95	1-3	---	NP
	31-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
37--------------- Paisley	0-4	Fine sand--------	SP-SM	A-2-4, A-3	0	100	100	80-99	6-12	---	NP
	4-80	Sandy clay, clay	CH, CL	A-7	0	95-100	90-100	75-95	51-70	41-51	25-35
38--------------- Pinellas	0-11	Fine sand--------	SP	A-3	0	100	100	90-100	2-4	---	NP
	11-22	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	22-27	Fine sandy loam, sandy clay loam.	SP-SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-100	12-35	20-30	5-13
	27-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0-5	80-100	75-100	60-95	2-12	---	NP

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
39: Arents.											
41--------------- Pomello	0-43	Fine sand--------	SP, SP-SM	A-3	0	100	100	60-100	1-8	---	NP
	43-55	Coarse sand, sand, fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	60-100	6-15	---	NP
	55-80	Coarse sand, sand, fine sand.	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP
42: Pomello---------	0-42	Fine sand--------	SP, SP-SM	A-3	0	100	100	60-100	1-8	---	NP
	42-54	Coarse sand, sand, fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	60-100	6-15	---	NP
	54-80	Coarse sand, sand, fine sand.	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP
Urban land.											
43. Quartzipsamments											
44--------------- St. Augustine	0-3	Fine sand--------	SP, SP-SM	A-3	0	85-95	80-95	80-90	2-5	---	NP
	3-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	85-95	80-95	80-90	5-15	---	NP
45: St. Augustine---	0-3	Fine sand--------	SP, SP-SM	A-3	0	85-95	80-95	80-90	2-5	---	NP
	3-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	85-95	80-95	80-90	5-15	---	NP
Urban land.											
46--------------- St. Johns	0-12	Fine sand--------	SP, SP-SM	A-3	0	100	100	75-95	3-10	---	NP
	12-29	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-95	3-10	---	NP
	29-46	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-20	---	NP
	46-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
47--------------- Seffner	0-13	Fine sand--------	SP-SM, SP	A-3, A-2-4	0	100	100	85-100	1-12	---	NP
	13-21	Fine sand, sand	SP-SM, SP	A-3, A-2-4	0	100	100	85-100	1-12	---	NP
	21-80	Fine sand, sand	SP-SM, SP	A-3, A-2-4	0	97-100	75-100	70-100	1-12	---	NP
50. Slickens											
51. Haplaquents											
52--------------- Smyrna	0-12	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	12-20	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	20-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
53:											
Tavares	0-6	Fine sand	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
Millhopper	0-57	Fine sand	SP-SM, SM	A-3, A-2-4	0	100	97-100	75-95	5-20	---	NP
	57-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-4	0	100	97-100	75-95	18-40	<28	NP-10
54:											
Tavares	0-3	Fine sand	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
	3-80	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
Millhopper	0-54	Fine sand	SP-SM, SM	A-3, A-2-4	0	100	97-100	75-95	5-20	---	NP
	54-68	Loamy sand, loamy fine sand.	SM	A-2-4	0	100	97-100	75-95	15-22	---	NP
	68-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-4	0	100	97-100	75-95	18-40	<28	NP-10
55:											
Tavares	0-6	Fine sand	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
Urban land.											
56. Urban land											
57 Wabasso	0-29	Fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	29-38	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	38-60	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	60-80	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	95-100	20-35	20-30	5-13
58:											
Wabasso	0-21	Fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	21-31	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
	31-48	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	95-100	20-35	20-30	5-13
	48-80	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
Urban land.											
59 Winder	0-10	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	10-14	Loamy sand, sandy loam, fine sandy loam.	SM	A-2-4	0	100	100	80-100	15-25	<35	NP-10
	14-30	Sandy clay loam	SC	A-2-4, A-2-6	0	100	100	80-100	18-35	20-40	9-26
	30-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4	0	60-80	50-75	40-70	15-35	<35	NP-20

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
60--------------- Winder	0-14	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	14-17	Loamy sand, sandy loam, fine sandy loam.	SM	A-2-4	0	100	100	80-100	15-25	<35	NP-10
	17-33	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC, GM-GC	A-2-4, A-2-6, A-1-B	0	60-80	50-75	40-70	15-35	<35	NP-20
	33-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4, A-1-B	0	60-80	50-75	40-70	3-20	<35	NP-10
61--------------- Zolfo	0-3	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	3-60	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-18	---	NP
	60-80	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-18	---	NP

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm					Pct
2----------------- Adamsville	0-6	1-8	1.35-1.65	6.0-20	0.05-0.10	4.5-7.8	<2	Low--------	0.10	5	2	<2
	6-80	1-7	1.35-1.65	6.0-20	0.03-0.08	4.5-7.8	<2	Low--------	0.10			
3----------------- Archbold	0-4	0-1	1.50-1.60	>20	0.03-0.05	3.6-5.5	<2	Low--------	0.10	5	1	.5-1
	4-80	0-1	1.50-1.60	>20	0.02-0.03	3.6-5.5	<2	Low--------	0.10			
4. Arents												
5:												
Basinger---------	0-7	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	<2	Low--------	0.10	5	2	1-8
	7-28	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	<2	Low--------	0.10			
	28-42	1-3	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	<2	Low--------	0.10			
	42-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	<2	Low--------	0.10			
Holopaw----------	0-6	1-3	1.15-1.25	6.0-20	0.15-0.20	5.1-7.3	<2	Low--------	0.10	5	2	6-10
	6-52	1-7	1.35-1.60	6.0-20	0.03-0.10	5.1-7.3	<2	Low--------	0.10			
	52-80	13-28	1.60-1.70	0.2-2.0	0.10-0.20	5.1-8.4	<2	Low--------	0.20			
Samsula----------	0-34	---	0.25-0.50	6.0-20	0.20-0.25	4.5-5.5	<2	Low--------	----	2	2	>20
	34-80	1-14	1.35-1.55	6.0-20	0.02-0.05	3.6-5.5	<2	Low--------	0.17			
6:												
Broward----------	0-4	2-8	1.35-1.45	6.0-20	0.05-0.10	5.6-8.4	<2	Low--------	0.10	2	2	<1
	4-26	1-7	1.50-1.60	6.0-20	0.03-0.08	5.6-8.4	<2	Low--------	0.10			
	26-80	---	---	---	---	---	---	-----------	----			
Urban land.												
7----------------- Candler	0-6	<3	1.35-1.55	6.0-20	0.04-0.08	4.5-6.0	<2	Low--------	0.10	5	2	.5-2
	6-72	<3	1.50-1.65	6.0-20	0.02-0.06	4.5-6.0	<2	Low--------	0.10			
	72-80	3-8	1.50-1.65	6.0-20	0.05-0.08	4.5-6.0	<2	Low--------	0.10			
8----------------- Candler	0-6	<3	1.35-1.55	6.0-20	0.04-0.08	4.5-6.0	<2	Low--------	0.10	5	2	.5-2
	6-74	<3	1.50-1.65	6.0-20	0.02-0.06	4.5-6.0	<2	Low--------	0.10			
	74-80	3-8	1.50-1.65	6.0-20	0.05-0.08	4.5-6.0	<2	Low--------	0.10			
9:												
Candler----------	0-6	<3	1.35-1.55	6.0-20	0.04-0.08	4.5-6.0	<2	Low--------	0.10	5	2	.5-2
	6-76	<3	1.50-1.65	6.0-20	0.02-0.06	4.5-6.0	<2	Low--------	0.10			
	76-80	3-8	1.50-1.65	6.0-20	0.05-0.08	4.5-6.0	<2	Low--------	0.10			
Urban land.												
10---------------- Chobee	0-16	7-15	1.45-1.50	2.0-6.0	0.10-0.15	6.1-7.3	<2	Low--------	0.10	5	2	2-7
	16-49	20-35	1.55-1.75	<0.2	0.12-0.17	7.4-8.4	<2	Moderate	0.32			
	49-80	7-20	1.60-1.75	0.2-6.0	0.06-0.10	7.4-8.4	<2	Low--------	0.20			
11---------------- Chobee	0-4	---	0.15-0.35	6.0-20	0.30-0.50	5.1-7.3	<2	Low--------	0.10	5	2	25-35
	4-12	0-15	1.45-1.50	2.0-6.0	0.10-0.15	5.6-7.3	<2	Low--------	0.15			
	12-49	10-30	1.40-1.45	<0.2	0.12-0.17	5.6-8.4	<2	Low--------	0.15			
	49-80	0-15	1.45-1.50	2.0-6.0	0.10-0.15	5.6-7.8	<2	Low--------	0.15			
12---------------- Chobee	0-15	7-20	1.45-1.50	2.0-6.0	0.10-0.15	6.1-7.3	<2	Low--------	0.15	5	3	2-7
	15-60	20-35	1.55-1.75	<0.2	0.12-0.17	7.4-8.4	<2	Moderate	0.32			
	60-80	7-20	1.60-1.75	0.2-6.0	0.06-0.10	7.4-8.4	<2	Low--------	0.20			

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm					Pct
13	0-22	1-8	1.30-1.55	6.0-20	0.03-0.05	4.5-5.5	<2	Low	0.10	5	2	<1
Eaton	22-80	35-55	1.55-1.70	0.06-0.2	0.12-0.17	4.5-6.0	<2	Moderate	0.28			
14	0-8	2-8	1.15-1.25	6.0-20	0.15-0.20	4.5-5.5	<2	Low	0.10	5	2	6-15
Eaton	8-22	2-10	1.30-1.55	6.0-20	0.05-0.10	4.5-6.0	<2	Moderate	0.10			
	22-80	35-55	1.55-1.70	0.06-0.2	0.10-0.15	4.5-6.5	<2	Moderate	0.28			
15	0-22	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	<2	Low	0.10	5	2	1-4
Felda	22-45	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.1-7.8	<2	Low	0.24			
	45-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-8.4	<2	Low	0.10			
16	0-22	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	<2	Low	0.10	5	2	1-4
Felda	22-38	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.1-7.8	<2	Low	0.24			
	38-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-7.8	<2	Low	0.10			
17	0-12	3-10	1.40-1.49	6.0-20	0.10-0.20	4.5-8.4	<2	Low	0.10	5	2	2-8
Floridana	12-28	1-7	1.52-1.58	6.0-20	0.05-0.10	4.5-8.4	<2	Low	0.10			
	28-60	15-30	1.60-1.69	<0.2	0.10-0.20	4.5-8.4	<2	Low	0.24			
	60-80	---	---	---	---	---	---	---	---			
18	0-26	3-13	1.15-1.55	6.0-20	0.08-0.15	5.1-7.3	<2	Low	0.15	5	2	1-5
Fort Meade	26-80	3-13	1.20-1.65	6.0-20	0.06-0.10	4.5-6.0	<2	Low	0.15			
19	0-80	4-10	1.40-1.55	6.0-20	0.05-0.10	4.5-6.5	<2	Low	0.15	5	2	2-4
Gainesville												
20.												
Gypsum land												
21	0-8	1-5	1.20-1.50	6.0-20	0.05-0.10	3.6-6.0	<2	Low	0.10	5	2	1-2
Immokalee	8-36	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	<2	Low	0.10			
	36-80	2-7	1.30-1.60	0.6-2.0	0.10-0.25	3.6-6.0	<2	Low	0.15			
22:												
Immokalee	0-5	1-5	1.20-1.50	6.0-20	0.05-0.10	3.6-6.0	<2	Low	0.10	5	2	1-2
	5-35	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	<2	Low	0.10			
	35-60	2-7	1.30-1.60	0.6-2.0	0.10-0.25	3.6-6.0	<2	Low	0.15			
	60-80	1-5	1.40-1.60	6.0-20	0.02-0.05	3.6-6.0	<2	Low	0.10			
Urban land.												
23	0-35	1-7	1.25-1.50	6.0-20	0.05-0.07	4.5-6.0	<2	Low	0.10	5	2	<2
Kendrick	35-68	15-25	1.55-1.70	0.6-6.0	0.10-0.15	4.5-6.0	<2	Low	0.24			
	68-80	20-40	1.55-1.75	0.06-2.0	0.12-0.20	4.5-6.0	<2	Low	0.32			
24	0-5	---	0.15-0.35	6.0-20	0.30-0.50	7.4-9.0	>16	Low	0.10	5	2	25-35
Kesson	5-80	1-4	1.50-1.65	2.0-20	0.05-0.10	7.4-9.0	>16	Low	0.10			
25	0-80	1-3	1.45-1.65	>6.0	0.03-0.08	4.5-5.5	<2	Low	0.10	5	2	.5-1
Lake												
26:												
Lochloosa	0-28	2-12	1.35-1.65	2.0-20	0.05-0.20	4.5-5.5	<2	Low	0.10	5	2	1-4
	28-35	13-20	1.55-1.70	0.6-6.0	0.10-0.15	4.5-5.5	<2	Low	0.24			
	35-69	15-35	1.55-1.70	0.6-0.2	0.12-0.15	4.5-5.5	<2	Low	0.28			
	69-80	15-35	1.55-1.70	0.06-0.2	0.10-0.15	4.5-5.5	<2	Low	0.28			
Micanopy	0-15	3-12	1.50-1.65	6.0-20	0.05-0.10	3.6-6.0	<2	Low	0.15	5	2	1-5
	15-25	20-38	1.50-1.65	0.6-2.0	0.10-0.15	3.6-6.0	<2	Moderate	0.32			
	25-59	40-60	1.55-1.70	0.06-0.2	0.10-0.18	3.6-6.0	<2	High	0.28			
	59-80	25-38	1.55-1.70	0.06-0.2	0.10-0.15	3.6-6.0	<2	High	0.32			

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm					Pct
27--------------- Malabar	0-12	0-4	1.35-1.55	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.10	5	2	1-2
	12-30	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10			
	30-50	1-5	1.40-1.70	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	50-66	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	66-80	1-8	1.40-1.70	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.15			
28: Millhopper------	0-57	2-8	1.50-1.67	6.0-20	0.05-0.10	4.5-6.5	<2	Low--------	0.10	5	2	.5-2
	57-80	12-28	1.80-1.90	0.06-2.0	0.08-0.15	4.5-6.0	<2	Low--------	0.28			
Urban land.												
29--------------- Myakka	0-20	<2	1.35-1.55	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10	5	2	<2
	20-30	1-8	1.45-1.60	0.6-6.0	0.10-0.20	3.6-6.5	<2	Low--------	0.15			
	30-80	<2	1.48-1.70	6.0-20	0.02-0.10	3.6-6.5	<2	Low--------	0.10			
30--------------- Myakka	0-22	<2	1.35-1.45	6.0-20	0.05-0.10	6.6-8.4	>16	Low--------	0.10	5	2	<1
	22-40	2-8	1.45-1.60	0.6-6.0	0.10-0.15	6.6-8.4	>16	Low--------	0.15			
	40-80	<2	1.50-1.60	6.0-20	0.05-0.10	6.6-8.4	>16	Low--------	0.10			
32: Myakka----------	0-20	<2	1.35-1.55	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10	5	2	<2
	20-44	1-8	1.45-1.60	0.6-6.0	0.10-0.20	3.6-6.5	<2	Low--------	0.15			
	44-80	<2	1.48-1.70	6.0-20	0.02-0.10	3.6-6.5	<2	Low--------	0.10			
Urban land.												
33--------------- Ona	0-4	1-7	1.40-1.55	6.0-20	0.10-0.15	3.6-6.0	<2	Low--------	0.10	5	2	1-5
	4-22	3-8	1.50-1.65	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low--------	0.15			
	22-80	1-4	1.50-1.65	6.0-20	0.03-0.08	3.6-6.0	<2	Low--------	0.10			
34: Ona-------------	0-4	1-7	1.40-1.55	6.0-20	0.10-0.15	3.6-6.0	<2	Low--------	0.10	5	2	1-5
	4-18	3-8	1.50-1.65	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low--------	0.15			
	18-80	1-4	1.50-1.65	6.0-20	0.03-0.08	3.6-6.0	<2	Low--------	0.10			
Urban land.												
35--------------- Orlando	0-20	1-8	1.35-1.45	6.0-20	0.07-0.12	4.5-6.5	<2	Low--------	0.10	5	2	1-5
	20-80	1-8	1.40-1.60	6.0-20	0.03-0.06	4.5-6.0	<2	Low--------	0.10			
36--------------- Orsino	0-31	<1	1.35-1.55	>20	0.02-0.08	3.6-6.0	<2	Low--------	0.10	5	2	<1
	31-80	<2	1.35-1.55	>20	0.02-0.08	3.6-6.0	<2	Low--------	0.10			
37--------------- Paisley	0-4	2-8	1.35-1.45	6.0-20	0.05-0.08	4.5-8.4	<2	Low--------	0.10	5	2	1-4
	4-80	45-65	1.55-1.65	0.06-0.2	0.15-0.18	5.6-8.4	<2	High-------	0.28			
38--------------- Pinellas	0-11	1-3	1.15-1.50	6.0-20	0.02-0.05	5.6-7.8	<2	Low--------	0.10	5	2	1-4
	11-22	3-8	1.40-1.60	6.0-20	0.10-0.15	6.6-9.0	<2	Low--------	0.17			
	22-27	13-30	1.50-1.65	0.6-2.0	0.10-0.15	6.6-9.0	<2	Low--------	0.24			
	27-80	2-8	1.55-1.65	6.0-20	0.02-0.05	7.9-8.4	<2	Low--------	0.10			
39: Arents.												
41--------------- Pomello	0-43	<2	1.35-1.65	>20	0.02-0.05	4.5-6.0	<2	Very low	0.10	5	1	<1
	43-55	<2	1.45-1.60	2.0-6.0	0.10-0.30	4.5-6.0	<2	Very low	0.15			
	55-80	<2	1.35-1.65	6.0-20	0.02-0.05	4.5-6.0	<2	Very low	0.10			

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
									K	T		
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm					Pct
42:												
Pomello----------	0-42	<2	1.35-1.65	>20	0.02-0.05	4.5-6.0	<2	Very low	0.10	5	1	<1
	42-54	<2	1.45-1.60	2.0-6.0	0.10-0.30	4.5-6.0	<2	Very low	0.15			
	54-80	<2	1.35-1.65	6.0-20	0.02-0.05	4.5-6.0	<2	Very low	0.10			
Urban land.												
43. Quartzipsamments												
44---------------- St. Augustine	0-3	0-2	1.30-1.40	6.0-20	0.02-0.05	6.1-8.4	<2	Low--------	0.10	5	2	1-3
	3-80	4-12	1.40-1.55	2.0-20	0.05-0.10	6.1-8.4	<2	Low--------	0.15			
45:												
St. Augustine----	0-3	0-2	1.30-1.40	6.0-20	0.02-0.05	6.1-8.4	<2	Low--------	0.10	5	2	1-3
	3-80	4-12	1.40-1.55	2.0-20	0.05-0.10	6.1-8.4	<2	Low--------	0.15			
Urban land.												
46---------------- St. Johns	0-12	1-4	1.30-1.50	6.0-20	0.10-0.15	3.6-5.5	<2	Low--------	0.10	5	2	2-4
	12-29	1-3	1.50-1.70	6.0-20	0.03-0.08	3.6-5.5	<2	Low--------	0.10			
	29-46	2-6	1.50-1.58	0.2-2.0	0.10-0.30	3.6-5.5	<2	Low--------	0.15			
	46-80	1-4	1.50-1.65	6.0-20	0.03-0.08	3.6-5.5	<2	Low--------	0.10			
47---------------- Seffner	0-13	1-8	1.35-1.45	6.0-20	0.07-0.12	4.5-7.3	<2	Low--------	0.10	5	2	1-5
	13-21	1-8	1.35-1.45	6.0-20	0.07-0.12	4.5-7.3	<2	Low--------	0.10			
	21-80	1-8	1.50-1.60	6.0-20	0.04-0.08	4.5-7.3	<2	Low--------	0.10			
50. Slickens												
51. Haplaquents												
52---------------- Smyrna	0-12	1-6	1.35-1.45	6.0-20	0.03-0.07	3.6-7.3	<2	Low--------	0.10	5	2	1-5
	12-20	3-8	1.35-1.45	0.6-6.0	0.10-0.20	3.6-7.3	<2	Low--------	0.15			
	20-80	1-6	1.50-1.65	6.0-20	0.03-0.07	4.5-5.5	<2	Low--------	0.10			
53:												
Tavares----------	0-6	0-4	1.25-1.60	>6.0	0.05-0.10	3.6-6.0	<2	Low--------	0.10	5	2	.5-2
	6-80	0-4	1.40-1.70	>6.0	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
Millhopper-------	0-57	2-8	1.50-1.67	6.0-20	0.05-0.10	4.5-6.5	<2	Low--------	0.10	5	2	.5-2
	57-80	12-28	1.80-1.90	0.06-2.0	0.08-0.15	4.5-6.0	<2	Low--------	0.28			
54:												
Tavares----------	0-3	0-4	1.25-1.60	>6.0	0.05-0.10	3.6-6.0	<2	Low--------	0.10	5	2	.5-2
	3-80	0-4	1.40-1.70	>6.0	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
Millhopper-------	0-54	2-8	1.50-1.67	6.0-20	0.05-0.10	4.5-6.5	<2	Low--------	0.10	5	2	.5-2
	54-68	8-14	1.60-1.80	2.0-6.0	0.08-0.12	4.5-6.0	<2	Low--------	0.15			
	68-80	12-28	1.80-1.90	0.06-2.0	0.08-0.15	4.5-6.0	<2	Low--------	0.28			
55:												
Tavares----------	0-6	0-4	1.25-1.60	>6.0	0.05-0.10	3.6-6.0	<2	Low--------	0.10	5	2	.5-2
	6-80	0-4	1.40-1.70	>6.0	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
Urban land.												
56. Urban land												

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm					Pct
57--------------- Wabasso	0-29	1-5	1.25-1.45	6.0-20	0.03-0.08	3.6-6.5	<2	Low--------	0.10	5	2	1-4
	29-38	0-5	1.35-1.55	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10			
	38-60	2-5	1.40-1.55	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	60-80	12-30	1.60-1.75	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
58:												
Wabasso---------	0-21	1-5	1.25-1.45	6.0-20	0.03-0.08	3.6-6.5	<2	Low--------	0.10	5	2	1-4
	21-31	0-5	1.35-1.55	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10			
	31-48	2-5	1.40-1.55	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	48-80	12-30	1.60-1.75	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
Urban land.												
59--------------- Winder	0-10	1-6	1.40-1.65	6.0-20	0.03-0.08	5.6-7.8	<2	Low--------	0.10	5	2	.1-2
	10-14	10-18	1.45-1.65	0.2-0.6	0.06-0.10	6.1-7.8	<2	Low--------	0.20			
	14-30	20-30	1.60-1.70	<0.2	0.10-0.15	6.6-8.4	<2	Low--------	0.24			
	30-80	15-30	1.50-1.70	<0.2	0.06-0.12	7.4-8.4	<2	Low--------	0.24			
60--------------- Winder	0-14	1-6	1.40-1.65	6.0-20	0.03-0.08	5.6-7.8	<2	Low--------	0.10	5	2	.1-2
	14-17	10-18	1.45-1.65	0.2-0.6	0.06-0.10	6.1-7.8	<2	Low--------	0.20			
	17-33	15-30	1.50-1.70	<0.2	0.06-0.12	7.4-8.4	<2	Low--------	0.24			
	33-80	6-13	1.40-1.65	6.0-20	0.03-0.10	7.4-8.4	<2	Low--------	0.24			
61--------------- Zolfo	0-3	1-5	1.40-1.55	6.0-20	0.10-0.15	4.5-7.3	<2	Low--------	0.10	5	2	.5-1
	3-60	1-5	1.50-1.60	6.0-20	0.03-0.10	4.5-7.3	<2	Low--------	0.10			
	60-80	1-5	1.50-1.70	0.6-2.0	0.10-0.25	3.6-6.5	<2	Low--------	0.15			

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
2----------------- Adamsville	C	None---------	---	---	2.0-3.5	Apparent	Jun-Nov	>60	---	---	---	Low-------	Moderate.
3----------------- Archbold	A	None---------	---	---	3.5-6.0	Apparent	Jun-Nov	>60	---	---	---	Low-------	Moderate.
4. Arents													
5: Basinger----------	D	None---------	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High------	Moderate.
Holopaw----------	D	None---------	---	---	+2-1.0	Apparent	Jun-Apr	>60	---	---	---	High------	Moderate.
Samsula----------	D	None---------	---	---	+2-1.0	Apparent	Jan-Dec	>60	---	16-20	30-34	High------	High.
6: Broward----------	C	None---------	---	---	1.5-2.5	Apparent	Jun-Nov	20-40	Soft	---	---	Low-------	Low.
Urban land.													
7, 8-------------- Candler	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Low-------	High.
9: Candler----------	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Low-------	High.
Urban land.													
10---------------- Chobee	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	Low.
11---------------- Chobee	D	None---------	---	---	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High------	High.
12---------------- Chobee	B/D	Frequent-----	Brief to very long.	Jun-Feb	0-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	Low.
13---------------- Eaton	D	None---------	---	---	0-1.0	Apparent	Jul-Oct	>60	---	---	---	High------	High.
14---------------- Eaton	D	None---------	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High------	High.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
15---------------- Felda	B/D	None---------	---	---	0-1.0	Apparent	Jul-Mar	>60	---	---	---	High-----	Moderate.
16---------------- Felda	B/D	Occasional	Brief-----	Jul-Feb	0-1.0	Apparent	Jul-Mar	>60	---	---	---	High-----	Moderate.
17---------------- Floridana	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	Low.
18---------------- Fort Meade	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
19---------------- Gainesville	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
20. Gypsum land													
21---------------- Immokalee	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
22: Immokalee---------	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
Urban land.													
23---------------- Kendrick	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	High.
24---------------- Kesson	D	Frequent----	Very long	Jan-Dec	0-0.5	Apparent	Jan-Dec	>60	---	---	---	High-----	Low.
25---------------- Lake	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
26: Lochloosa---------	C	None---------	---	---	2.5-5.0	Apparent	Jul-Oct	>60	---	---	---	High-----	High.
Micanopy----------	C	None---------	---	---	1.5-2.5	Perched	Jul-Nov	>60	---	---	---	High-----	High.
27---------------- Malabar	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
28: Millhopper--------	A	None---------	---	---	3.5-6.0	Perched	Aug-Feb	>60	---	---	---	Low------	Moderate.
Urban land.													
29---------------- Myakka	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
30------------------ Myakka	D	Frequent----	Very long	Jan-Dec	0-1.0	Apparent	Jan-Dec	>60	---	---	---	High-----	Low.
32:													
Myakka-----------	B/D	None--------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
Urban land.													
33------------------ Ona	B/D	None--------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
34:													
Ona--------------	B/D	None--------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
Urban land.													
35------------------ Orlando	A	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
36------------------ Orsino	A	None--------	---	---	3.5-5.0	Apparent	Jun-Dec	>60	---	---	---	Low------	Moderate.
37------------------ Paisley	D	None--------	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Moderate.
38------------------ Pinellas	B/D	None--------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
39: Arents.													
41------------------ Pomello	C	None--------	---	---	2.0-3.5	Apparent	Jul-Nov	>60	---	---	---	Low------	High.
42:													
Pomello----------	C	None--------	---	---	2.0-3.5	Apparent	Jul-Nov	>60	---	---	---	Low------	High.
Urban land.													
43. Quartzipsamments													
44------------------ St. Augustine	C	Rare--------	---	---	1.5-3.0	Apparent	Jul-Oct	>60	---	---	---	High-----	High.
45:													
St. Augustine----	C	Rare--------	---	---	1.5-3.0	Apparent	Jul-Oct	>60	---	---	---	High-----	High.
Urban land.													

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
46 St. Johns	B/D	None	---	---	0-1.0	Apparent	Jun-Apr	>60	---	---	---	High	High.
47 Seffner	C	None	---	---	1.5-3.5	Apparent	Jun-Nov	>60	---	---	---	Low	Moderate.
50. Slickens													
51. Haplaquents													
52 Smyrna	B/D	None	---	---	0-1.0	Apparent	Jul-Oct	>60	---	---	---	High	High.
53, 54:													
Tavares	A	None	---	---	3.5-6.0	Apparent	Jun-Dec	>60	---	---	---	Low	High.
Millhopper	A	None	---	---	3.5-6.0	Perched	Aug-Feb	>60	---	---	---	Low	Moderate.
55:													
Tavares	A	None	---	---	3.5-6.0	Apparent	Jun-Dec	>60	---	---	---	Low	High.
Urban land.													
56. Urban land													
57 Wabasso	B/D	None	---	---	0-1.0	Apparent	Jun-Oct	>60	---	---	---	Moderate	High.
58:													
Wabasso	B/D	None	---	---	0-1.0	Apparent	Jun-Oct	>60	---	---	---	Moderate	High.
Urban land.													
59 Winder	B/D	None	---	---	0-1.0	Apparent	Jun-Dec	>60	---	---	---	High	Low.
60 Winder	B/D	Frequent	Long	Jul-Oct	0-1.0	Apparent	Jun-Dec	>60	---	---	---	High	Low.
61 Zolfo	C	None	---	---	2.0-3.5	Apparent	Jun-Nov	>60	---	---	---	Low	Moderate.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adamsville	Hyperthermic, uncoated Aquic Quartzipsamments
Archbold	Hyperthermic, uncoated Typic Quartzipsamments
Basinger	Siliceous, hyperthermic Spodic Psammaquents
Broward	Hyperthermic, uncoated Aquic Quartzipsamments
Candler	Hyperthermic, uncoated Typic Quartzipsamments
Chobee	Fine-loamy, siliceous, hyperthermic Typic Argiaquolls
Eaton	Clayey, mixed, hyperthermic Arenic Albaqualfs
Felda	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Floridana	Loamy, siliceous, hyperthermic Arenic Argiaquolls
Fort Meade	Sandy, siliceous, hyperthermic Quartzipsammentic Haplumbrepts
Gainesville	Hyperthermic, coated Typic Quartzipsamments
Holopaw	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Immokalee	Sandy, siliceous, hyperthermic Arenic Haplaquods
Kendrick	Loamy, siliceous, hyperthermic Arenic Paleudults
Kesson	Siliceous, hyperthermic Typic Psammaquents
Lake	Hyperthermic, coated Typic Quartzipsamments
Lochloosa	Loamy, siliceous, hyperthermic Aquic Arenic Paleudults
Malabar	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Micanopy	Fine, mixed, hyperthermic Aquic Paleudalfs
Millhopper	Loamy, siliceous, hyperthermic Grossarenic Paleudults
Myakka	Sandy, siliceous, hyperthermic Aeric Haplaquods
Ona	Sandy, siliceous, hyperthermic Typic Haplaquods
Orlando	Sandy, siliceous, hyperthermic Quartzipsammentic Haplumbrepts
Orsino	Hyperthermic, uncoated Spodic Quartzipsamments
Paisley	Fine, montmorillonitic, hyperthermic Typic Albaqualfs
* Pinellas	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Pomello	Sandy, siliceous, hyperthermic Arenic Haplohumods
St. Augustine	Sandy, siliceous, hyperthermic Udalfic Arents
St. Johns	Sandy, siliceous, hyperthermic Typic Haplaquods
Samsula	Sandy or sandy-skeletal, siliceous, dysic, hyperthermic Terric Medisaprists
Seffner	Sandy, siliceous, hyperthermic Quartzipsammentic Haplumbrepts
Smyrna	Sandy, siliceous, hyperthermic Aeric Haplaquods
Tavares	Hyperthermic, uncoated Typic Quartzipsamments
Wabasso	Sandy, siliceous, hyperthermic Alfic Haplaquods
Winder	Fine-loamy, siliceous, hyperthermic Typic Glossaqualfs
Zolfo	Sandy, siliceous, hyperthermic Grossarenic Entic Haplohumods

* An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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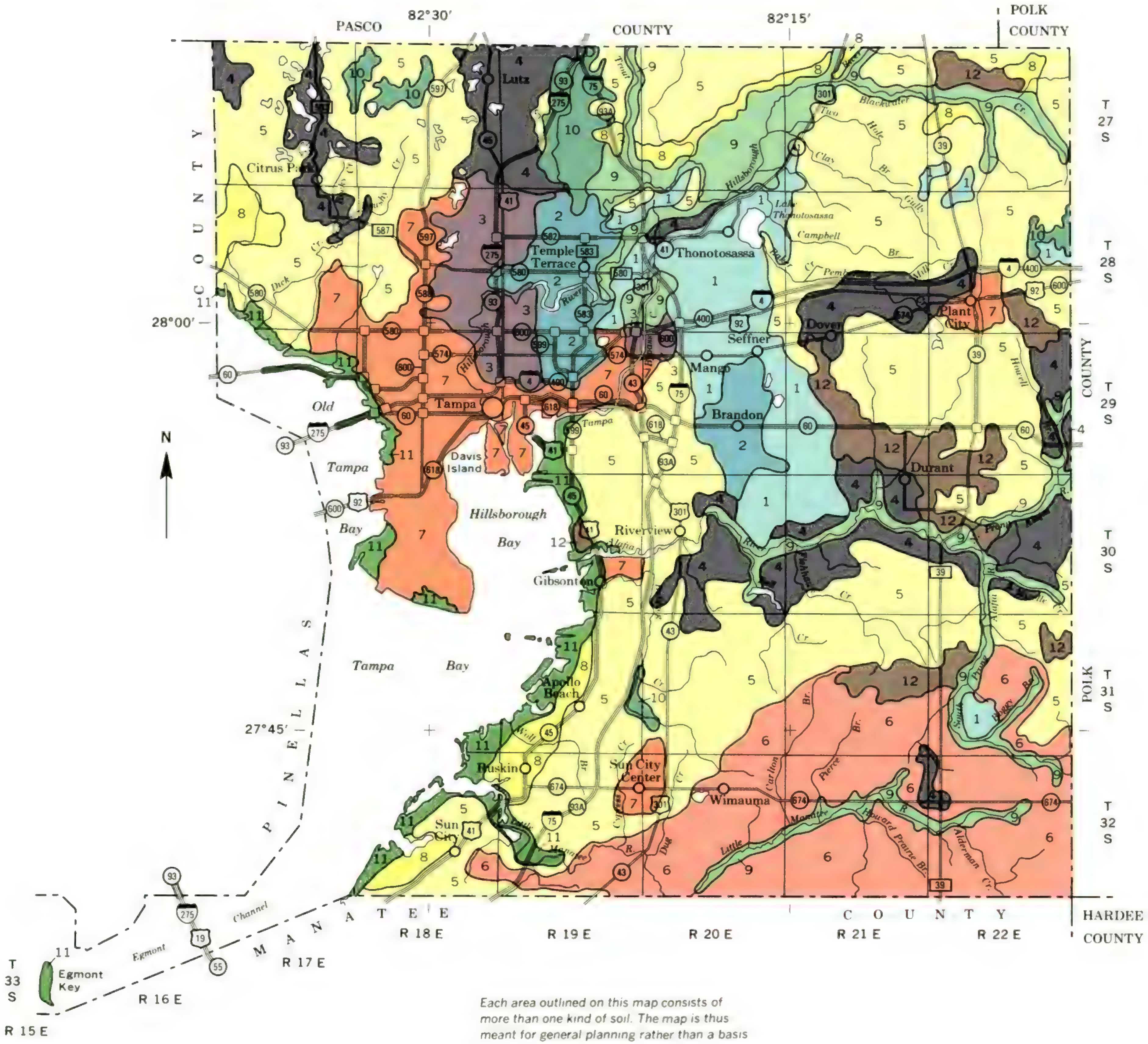


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

SOILS OF THE UPLANDS AND LOW RIDGES

1 — Candler-Lake: Nearly level to strongly sloping, excessively drained soils that are sandy throughout

2 — Urban land-Candler: Nearly level to strongly sloping, excessively drained soils that are sandy throughout and have thin lamellae below 66 inches of the surface; most areas have been modified for urban use

3 — Urban land-Tavares: Nearly level to sloping, moderately well drained soils that are sandy throughout; most areas have been modified for urban use

4 — Zolfo-Seffner-Tavares: Nearly level to moderately sloping, moderately well drained and somewhat poorly drained soils that have a sandy subsoil or are sandy throughout

SOILS OF THE FLATWOODS

5 — Myakka-Basinger-Holopaw: Nearly level, poorly drained and very poorly drained soils that have a sandy subsoil, are sandy throughout, or have a loamy subsoil

6 — Myakka-Immokalee-Pomello: Nearly level to gently sloping, poorly drained and moderately well drained soils that have a sandy subsoil

7 — Urban land-Myakka-Smyrna: Nearly level, poorly drained soils that have a sandy subsoil; most areas have been modified for urban use

8 — Malabar-Wabasso-Basinger: Nearly level, poorly drained and very poorly drained soils that have a loamy subsoil, or have a sandy and loamy subsoil, or are sandy throughout

SOILS OF THE WETLANDS AND COASTAL AREAS

9 — Winder-Chobee-St. Johns: Nearly level, poorly drained and very poorly drained soils that have a loamy or a sandy subsoil

10 — Samsula-Basinger: Nearly level, very poorly drained soils that are mucky in the upper part and sandy in the lower part or are sandy throughout

11 — Myakka-Urban land-St. Augustine: Nearly level, very poorly drained to somewhat poorly drained soils that have a sandy subsoil or are sandy throughout; many areas have been modified for urban use

SOILS OF THE MANMADE AREAS

12 — Arents-Haplaquents-Quartzipsamments: Very steep, heterogenous soils; nearly level, very poorly drained soils that are clayey throughout; and moderately well drained to excessively drained soils that are sandy throughout

COMPILED 1986

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
AGRICULTURAL EXPERIMENT STATIONS
SOIL SCIENCE DEPARTMENT
FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

GENERAL SOIL MAP

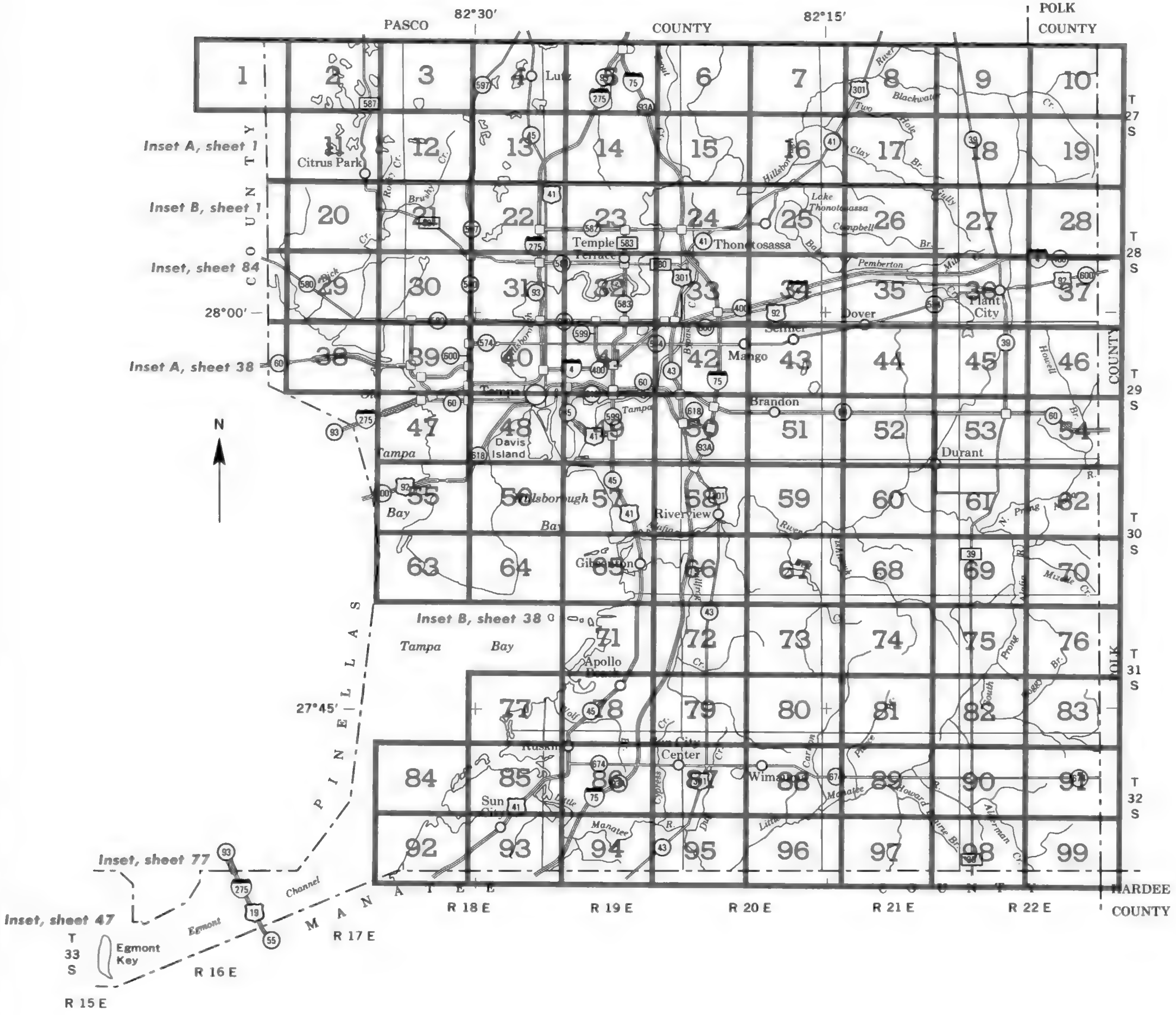
HILLSBOROUGH COUNTY, FLORIDA

Scale 1:316,800

1 0 1 2 3 4 5 Miles

1 0 5 10 Km

Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1982 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

INDEX TO MAP SHEETS

HILLSBOROUGH COUNTY, FLORIDA

Scale 1:316,800

1 0 1 2 3 4 5 Miles

1 0 5 10 Km

SOIL LEGEND

The publication symbols are numeric. An alpha and numeric legend are included and will precede the maps in the text. Soil map unit names without a slope phase are either nearly level or they are miscellaneous areas

NUMERICAL LIST

SYMBOL	NAME
2	Adamsville fine sand
3	Archbold fine sand
4	Arents, nearly level
5	Basinger, Holopaw and Samsula soils, depressional
6	Broward-Urban land complex
7	Candler fine sand, 0 to 5 percent slopes
8	Candler fine sand, 5 to 12 percent slopes
9	Candler-Urban land complex, 0 to 5 percent slopes
10	Chobee loamy fine sand
11	Chobee muck, depressional
12	Chobee sandy loam, frequently flooded
13	Eaton fine sand
14	Eaton mucky sand, depressional
15	Felda fine sand
16	Felda fine sand, occasionally flooded
17	Floridana fine sand
18	Fort Meade loamy fine sand, 0 to 5 percent slopes
19	Gainesville loamy fine sand, 0 to 5 percent slopes
20	Gypsum land
21	Immokalee fine sand
22	Immokalee-Urban land complex
23	Kendrick fine sand, 2 to 5 percent slopes
24	Kesson muck, frequently flooded
25	Lake fine sand, 0 to 5 percent slopes
26	Lochloosa-Micanopy fine sands, 0 to 5 percent slopes
27	Malabar fine sand
28	Millhopper-Urban land complex, 0 to 5 percent slopes
29	Myakka fine sand
30	Myakka fine sand, frequently flooded
32	Myakka-Urban land complex
33	Ona fine sand
34	Ona-Urban land complex
35	Orlando fine sand, 0 to 5 percent slopes
36	Orsino fine sand, 0 to 5 percent slopes
37	Paisley fine sand, depressional
38	Pinellas fine sand
39	Arents, very steep
41	Pomello fine sand, 0 to 5 percent slopes
42	Pomello-Urban land complex, 0 to 5 percent slopes
43	Quartzipsamments, nearly level
44	St. Augustine fine sand
45	St. Augustine-Urban land complex
46	St. Johns fine sand
47	Seffner fine sand
50	Slickens
51	Haplaquents, clayey
52	Smyrna fine sand
53	Tavares-Millhopper fine sands, 0 to 5 percent slopes
54	Tavares-Millhopper fine sands, 5 to 8 percent slopes
55	Tavares-Urban land complex, 0 to 5 percent slopes
56	Urban land
57	Wabasso fine sand
58	Wabasso-Urban land complex
59	Winder fine sand
60	Winder fine sand, frequently flooded
61	Zolfo fine sand

ALPHABETICAL LIST

SYMBOL	NAME
2	Adamsville fine sand
3	Archbold fine sand
4	Arents, nearly level
39	Arents, very steep
5	Basinger, Holopaw and Samsula soils, depressional
6	Broward-Urban land complex
7	Candler fine sand, 0 to 5 percent slopes
8	Candler fine sand, 5 to 12 percent slopes
9	Candler-Urban land complex, 0 to 5 percent slopes
10	Chobee loamy fine sand
11	Chobee muck, depressional
12	Chobee sandy loam, frequently flooded
13	Eaton fine sand
14	Eaton mucky sand, depressional
15	Felda fine sand
16	Felda fine sand, occasionally flooded
17	Floridana fine sand
18	Fort Meade loamy fine sand, 0 to 5 percent slopes
19	Gainesville loamy fine sand, 0 to 5 percent slopes
20	Gypsum land
51	Haplaquents, clayey
21	Immokalee fine sand
22	Immokalee-Urban land complex
23	Kendrick fine sand, 2 to 5 percent slopes
24	Kesson muck, frequently flooded
25	Lake fine sand, 0 to 5 percent slopes
26	Lochloosa-Micanopy fine sands, 0 to 5 percent slopes
27	Malabar fine sand
28	Millhopper-Urban land complex, 0 to 5 percent slopes
29	Myakka fine sand
30	Myakka fine sand, frequently flooded
32	Myakka-Urban land complex
33	Ona fine sand
34	Ona-Urban land complex
35	Orlando fine sand, 0 to 5 percent slopes
36	Orsino fine sand, 0 to 5 percent slopes
37	Paisley fine sand, depressional
38	Pinellas fine sand
41	Pomello fine sand, 0 to 5 percent slopes
42	Pomello-Urban land complex, 0 to 5 percent slopes
43	Quartzipsamments, nearly level
44	St. Augustine fine sand
45	St. Augustine-Urban land complex
46	St. Johns fine sand
47	Seffner fine sand
50	Slickens
52	Smyrna fine sand
53	Tavares-Millhopper fine sands, 0 to 5 percent slopes
54	Tavares-Millhopper fine sands, 5 to 8 percent slopes
55	Tavares-Urban land complex, 0 to 5 percent slopes
56	Urban land
57	Wabasso fine sand
58	Wabasso-Urban land complex
59	Winder fine sand
60	Winder fine sand, frequently flooded
61	Zolfo fine sand

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Swift Airport

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 7, 8

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

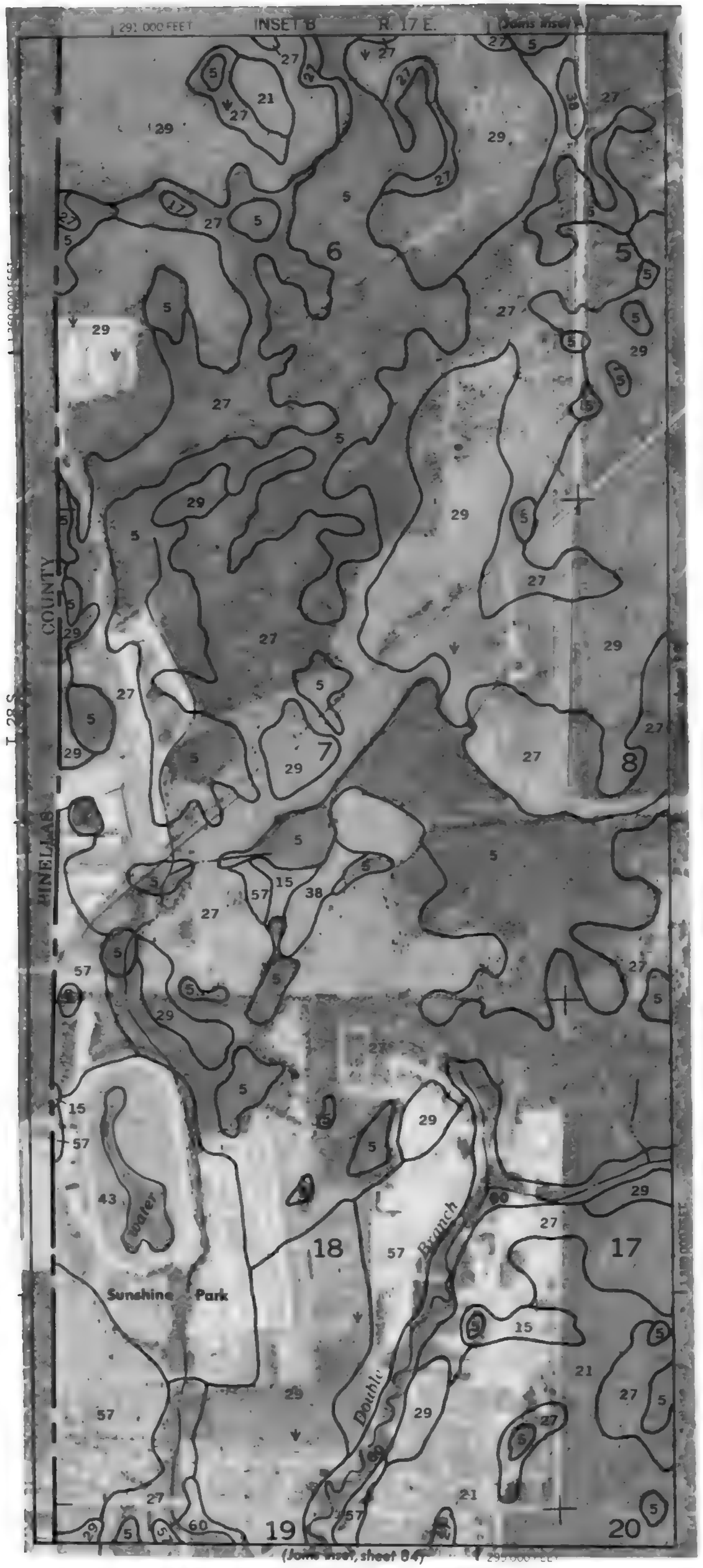
GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

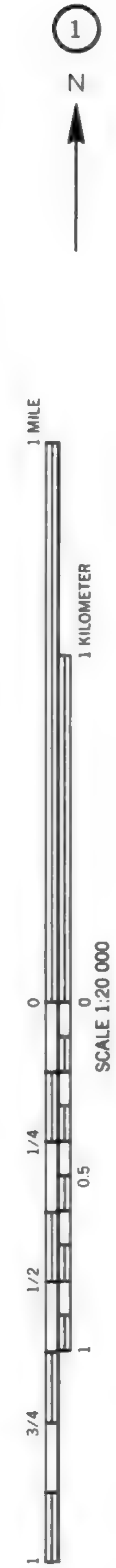
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Quartzipsamments (less than 4 acres)
- Arents (less than 4 acres)



4000 AND 5000 FOOT GRID TICKS

4000 AND 5000-FOOT GRID TICKS



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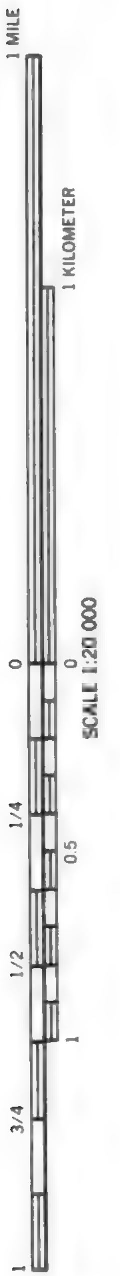
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1 KILOMETER
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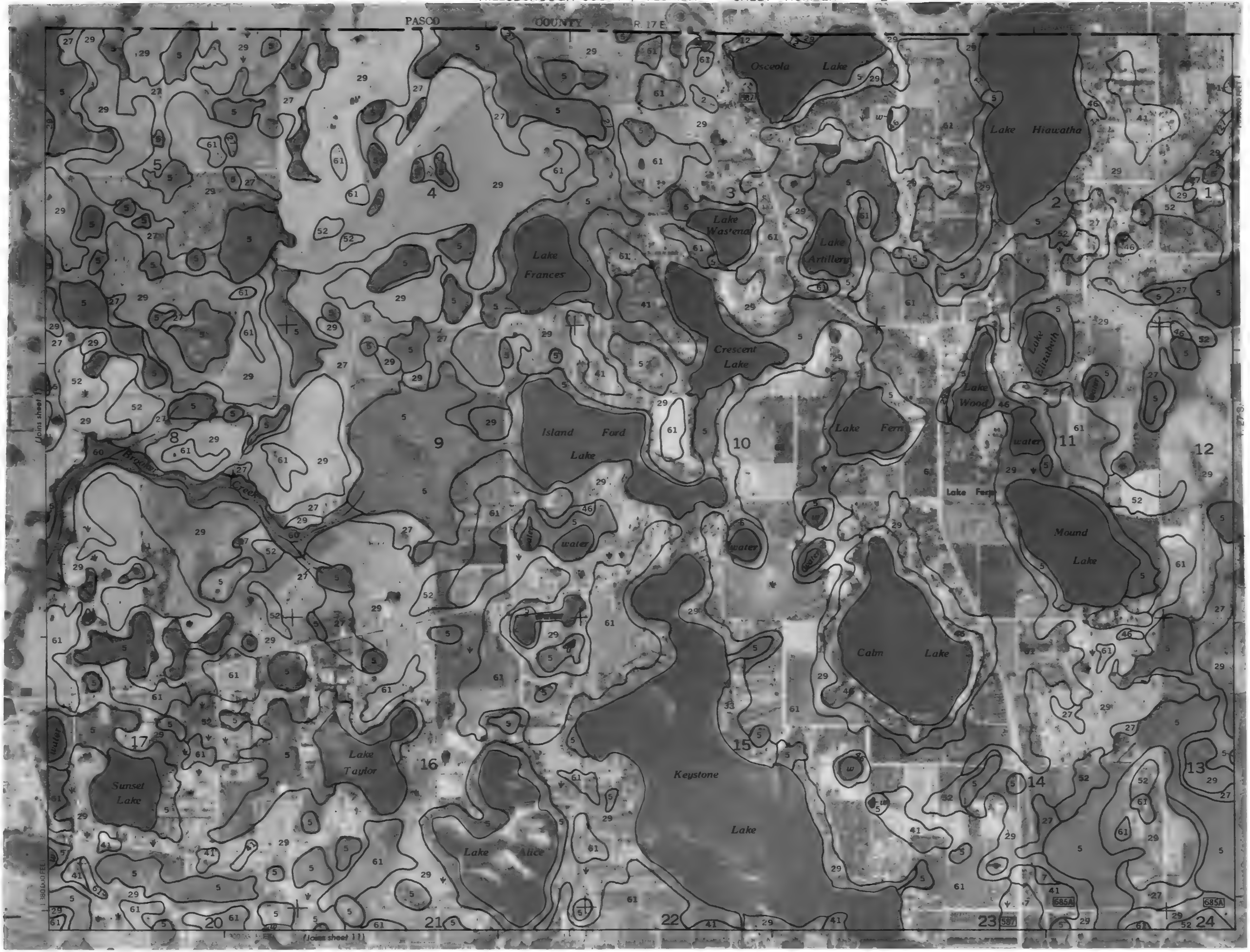
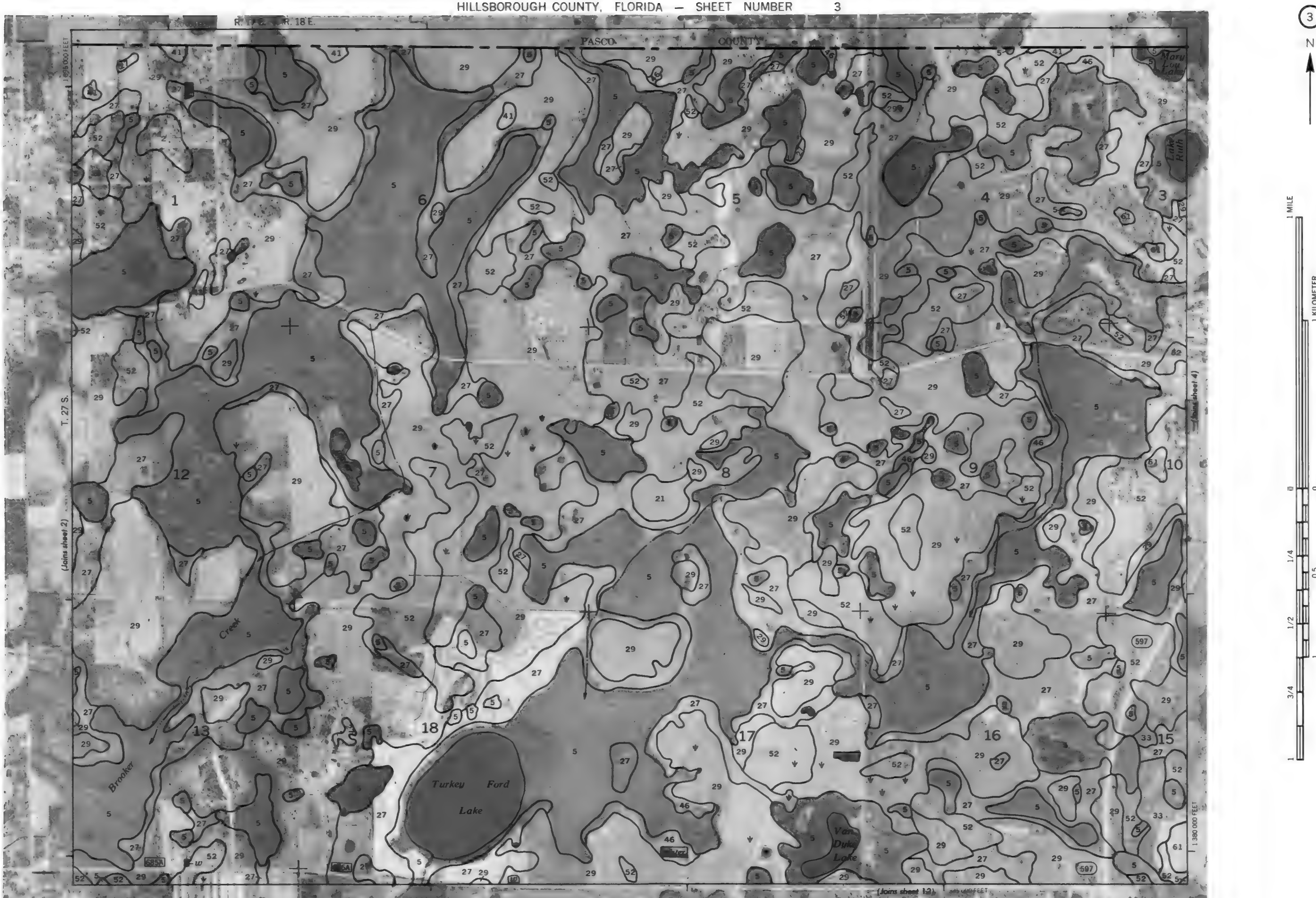
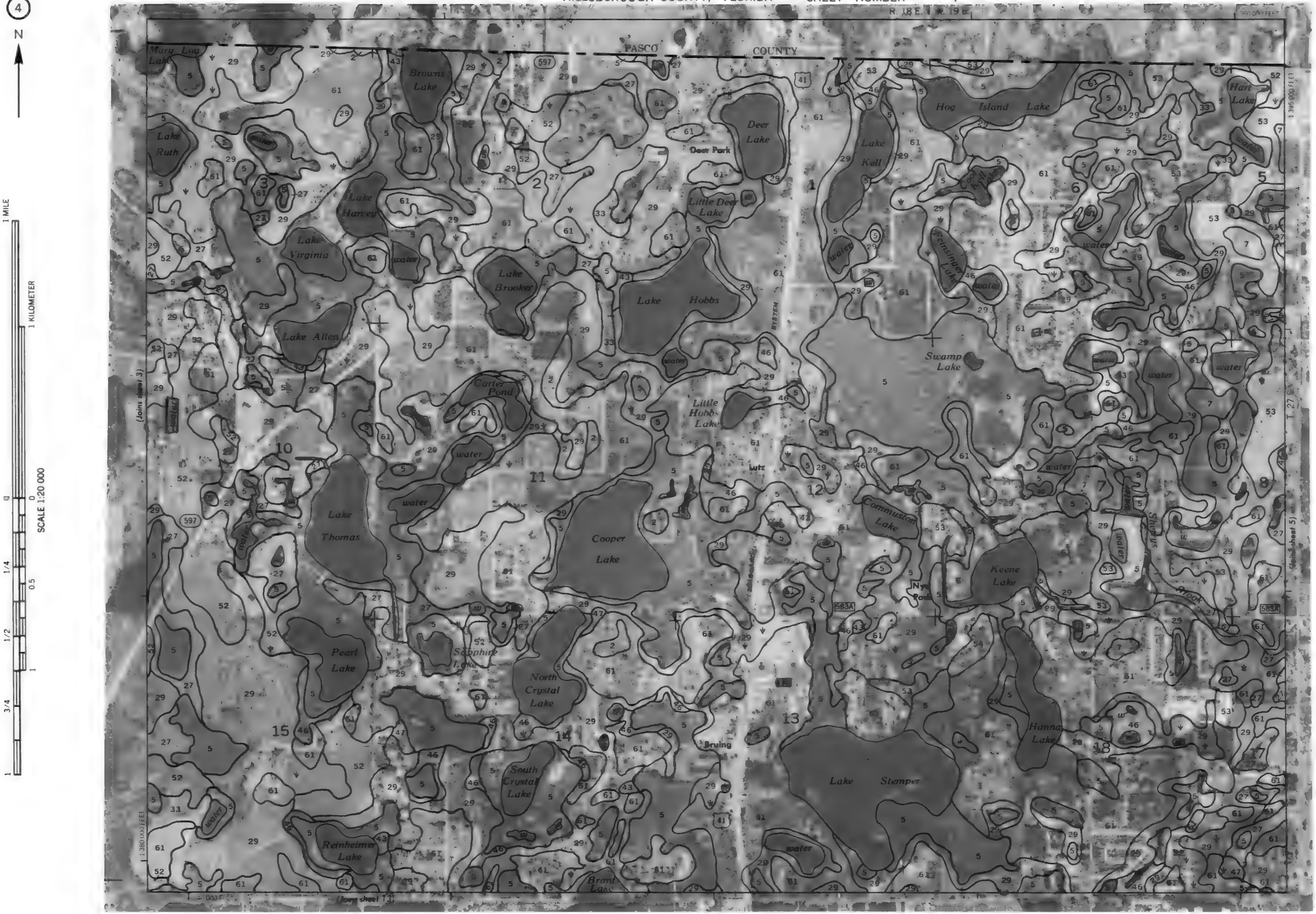
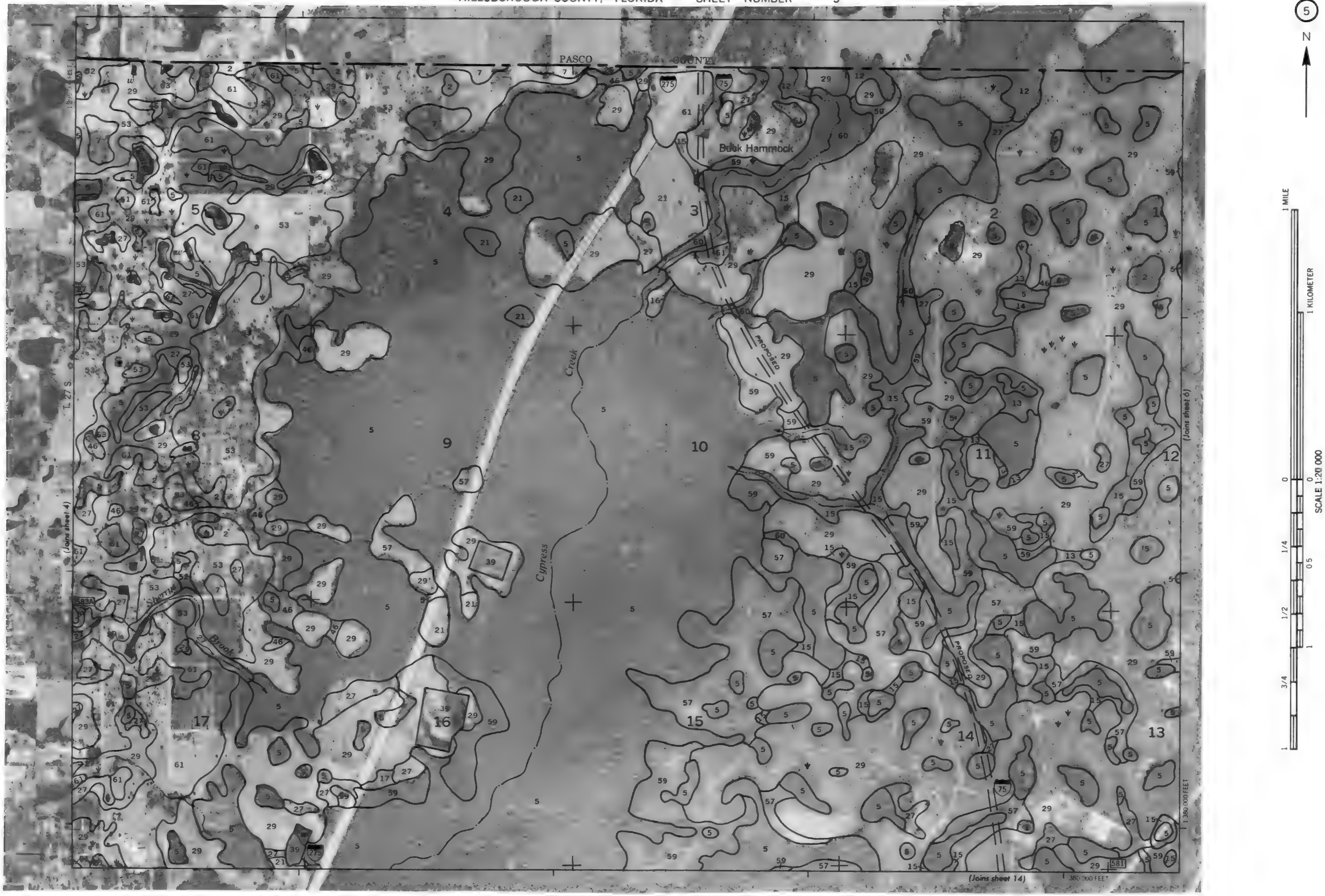
0
1/4
0.5
1/2
1
3/4
1

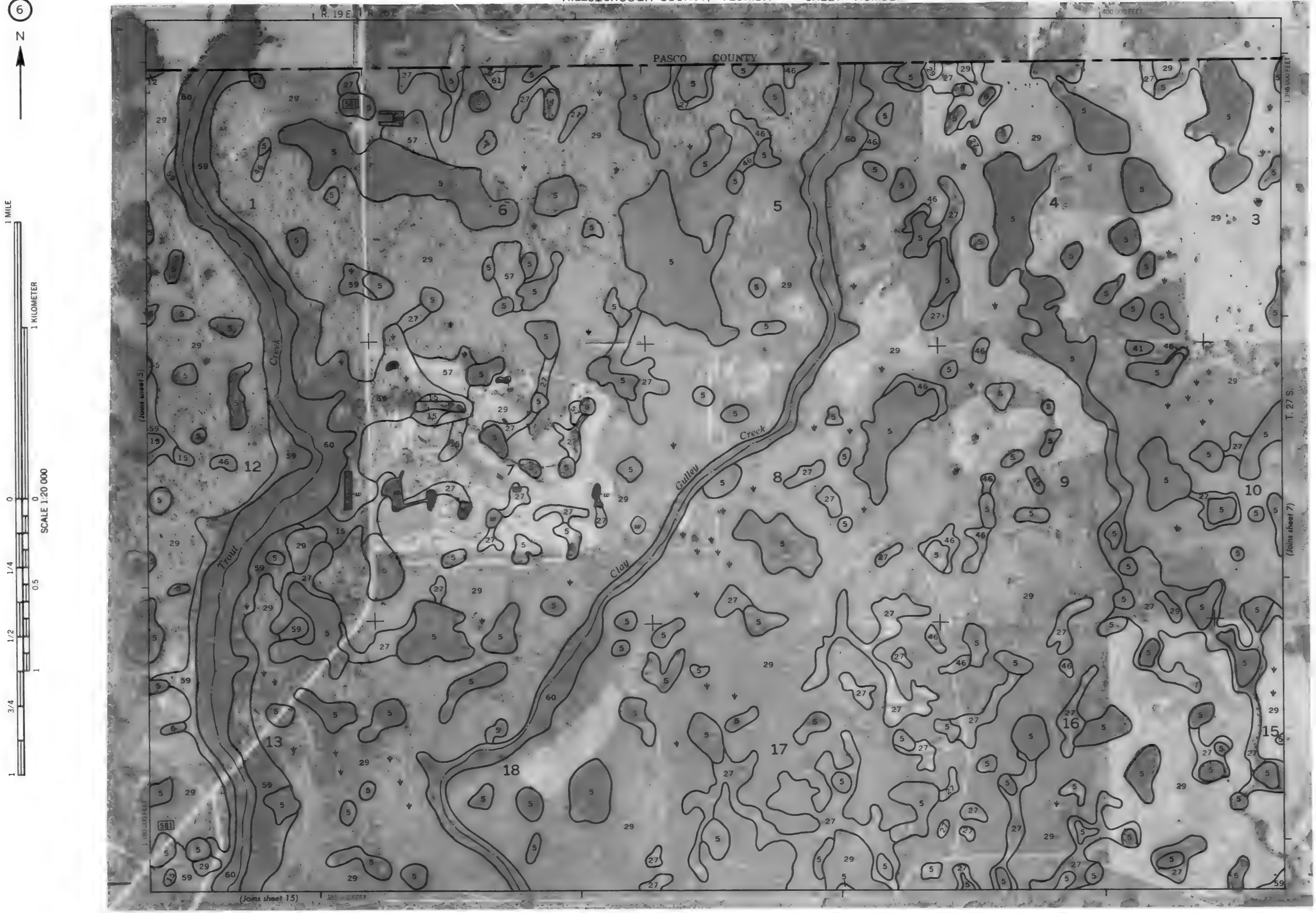

PASCO COUNTY
R. 17 E.
Osceola Lake
Lake Hiawatha
Lake Wastena
Lake Artillery
Lake Frances
Crescent Lake
Lake Elizabeth
Lake Wood
Lake Fern
Island Ford Lake
Brooker Creek
Lake Fern
Mound Lake
water
Calm Lake
Keystone Lake
Lake Taylor
Sunset Lake
Lake Alice
(Joins sheet 1)
(Joins sheet 11)
685A
587


3
N
R. 17 E. R. 18 E.
PASCO COUNTY
T. 27 S.
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 12)
Mary Lou Lake
Lake Ruth
Turkey Ford Lake
Van Dyke Lake
Brooker Creek
597
685A
1 380 000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


4
N
1 MILE
1 KILOMETER
SCALE 1:20 000
R. 18 E. | R. 19 E.
PASCO COUNTY
Mary Lou Lake
Lake Ruth
Browns Lake
Deer Lake
Deer Park
Little Deer Lake
Lake Keli
Hog Island Lake
Hart Lake
Lake Harvey
Lake Virginia
Lake Brooker
Lake Hobbs
Lake Allen
Swamp Lake
Carter Pond
Little Hobbs Lake
Lutz
Lake Thomas
Cooper Lake
Commusion Lake
Keene Lake
Pearl Lake
Sapphire Lake
North Crystal Lake
South Crystal Lake
Hanna Lake
Lake Stemper
Reinheimer Lake
Brant Lake
Bruing
water
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 13)
T. 27 S.
1 395 000 FEET
1 380 000 FEET

HILLSBOROUGH COUNTY, FLORIDA — SHEET NUMBER 5

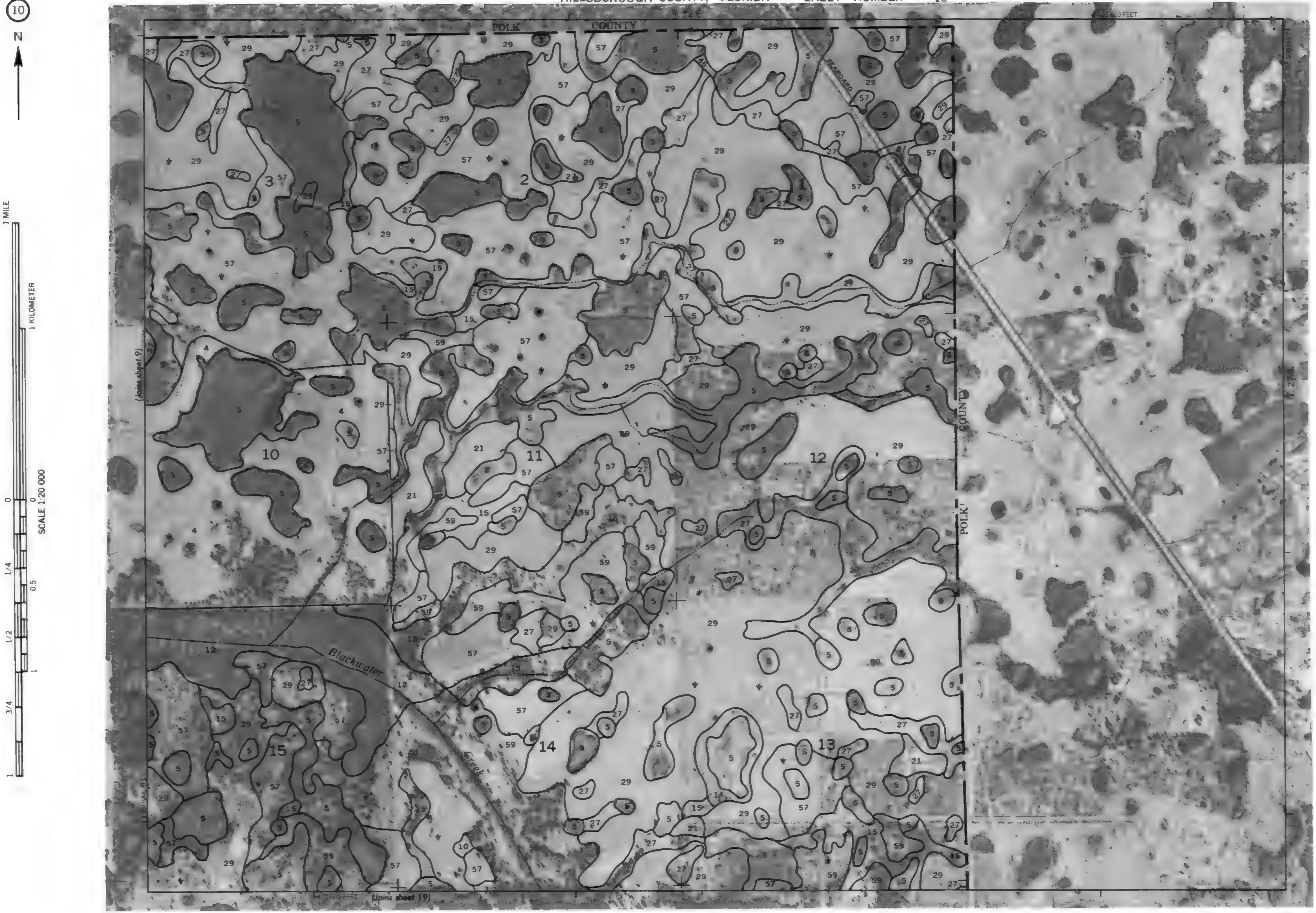


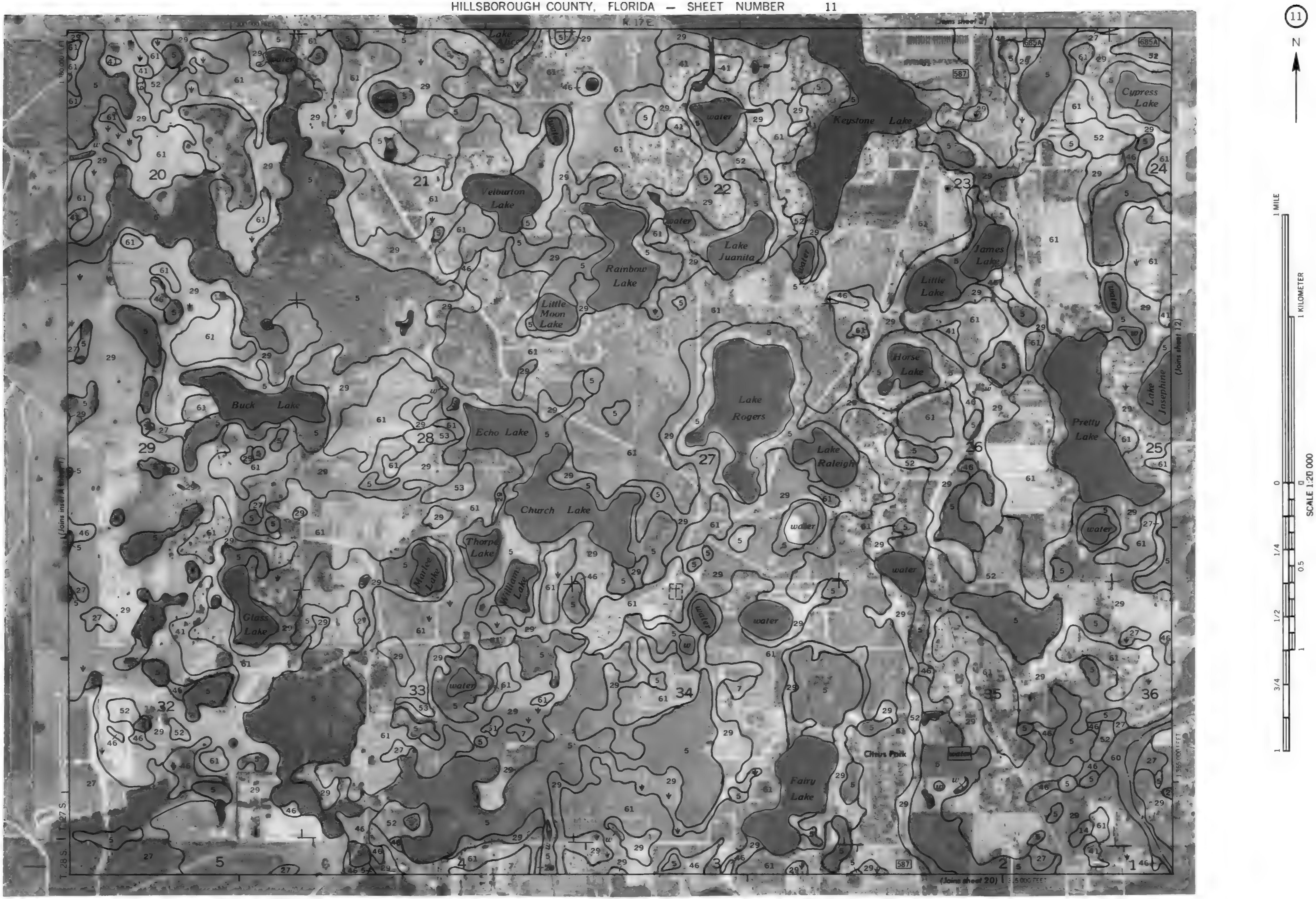

6
N
R. 19 E.
R. 20 E.
PASCO COUNTY
Trout Creek
Clay Gulley Creek
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 15)
T. 27 S.
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5
581


7
N
PASCO COUNTY
New River
Bass River
HILLSBOROUGH RIVER STATE PARK
RIVER
HILLSBOROUGH
Branchton
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 16)
1 MILE
1 KILOMETER
SCALE 1:20 000

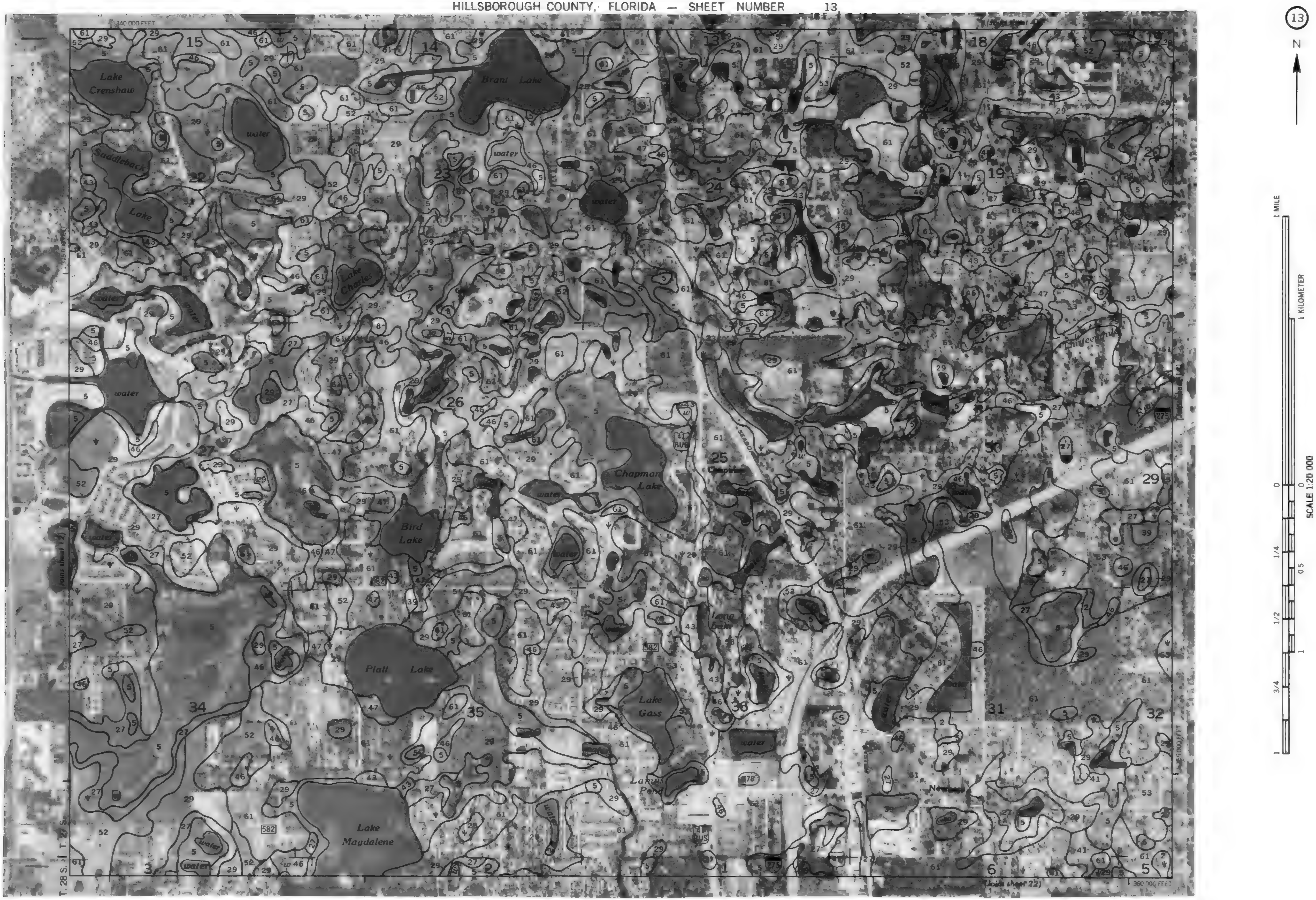

8
N
1 MILE
1 KILOMETER
SCALE 1:20 000
PASCO COUNTY
R. 21 E.
Glennell
301
HILLSBOROUGH RIVER STATE PARK
HILLSBOROUGH
RIVER
Blackwater
Creek
Big Ditch
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 17)

9
N
R 21 E
R 22 E
450 000 FEET
PASCO
COUNTY
POLK CO
Central
Big
Ditch
TAILINGS
Cone
SEABOARD
Blackwater
Creek
Ichepackesassa
Creek
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 18)
1 MILE
1 KILOMETER
SCALE 1:20 000


10
N
POLK COUNTY
SEABOARD
Blackwater
Creek
(Joins sheet 9)
(Joins sheet 19)
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1


11
N
R. 17 E.
(Joins sheet 3)
(Joins sheet 12)
(Joins sheet 20)
(Joins inset A sheet 17)
T. 27 S.
T. 28 S.
Lake Alice
Keystone Lake
Cypress Lake
Velourton Lake
Rainbow Lake
Lake Juanita
Little Moon Lake
James Lake
Little Lake
Horse Lake
Lake Rogers
Lake Raleigh
Buck Lake
Echo Lake
Church Lake
Pretty Lake
Lake Josephine
Thorpe Lake
Marlee Lake
Williams Lake
Glass Lake
Fairy Lake
Citrus Park
water
587
685A
1 MILE
1 KILOMETER
SCALE 1:20 000


12
N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 3)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 21)
335 000 FEET
320 000 FEET
Van Dyke Lake
Lake Helen
Lake Ellen
Lake Barbara
Sunshine Lake
Starvation Lake
Round Lake
Rock Lake
Lake Josephine
Lake LeClare
Lake Armistead
Little Halfmoon Lake
Halfmoon Lake
Rocky Creek
Brushy Creek
T. 27 S.

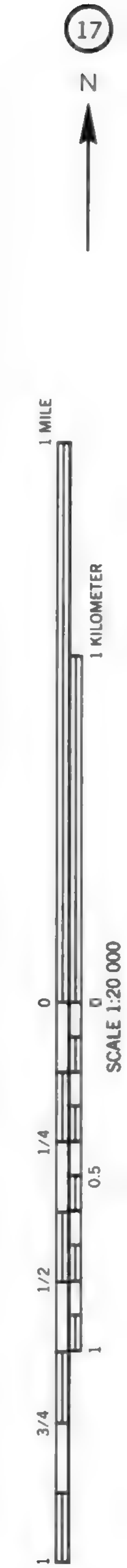

13
N
Lake Crenshaw
Brant Lake
Saddleback Lake
Lake Charles
Chapman Lake
Bird Lake
Platt Lake
Long Lake
Lake Gass
Lamps Pond
Lake Magdalene
water
340 000 FEET
(Joins sheet 12)
(Joins sheet 22)
T. 28 S.
T. 27 S.
1 MILE
1 KILOMETER
SCALE 1:20 000


14
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
3/4
1
R. 19 E.
(Joins sheet 5)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 23)
T. 27 S.
T. 28 S.
Thirteenmile Run
Cypress Creek
water
Rock Hammock
275
75
581

R. 19 E. | R. 20 E.
(Joins sheet 6)
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 24)
Trout Creek
Clay Gulley Creek
HILLSBOROUGH RIVER
T. 27 S.
T. 28 S.
400 000 FEET
1 360 000 FEET
15
N
1 MILE
1 KILOMETER
SCALE 1:20 000


16
N
1 MILE
1 KILOMETER
SCALE 1:20 000
HILLSBOROUGH
RIVER
STATE
PARK
HRSP
Two Hole Branch
Flint Creek
(Joins sheet 15)
(Joins sheet 12)
(Joins sheet 26)
R. 20 E. | R. 21 E.

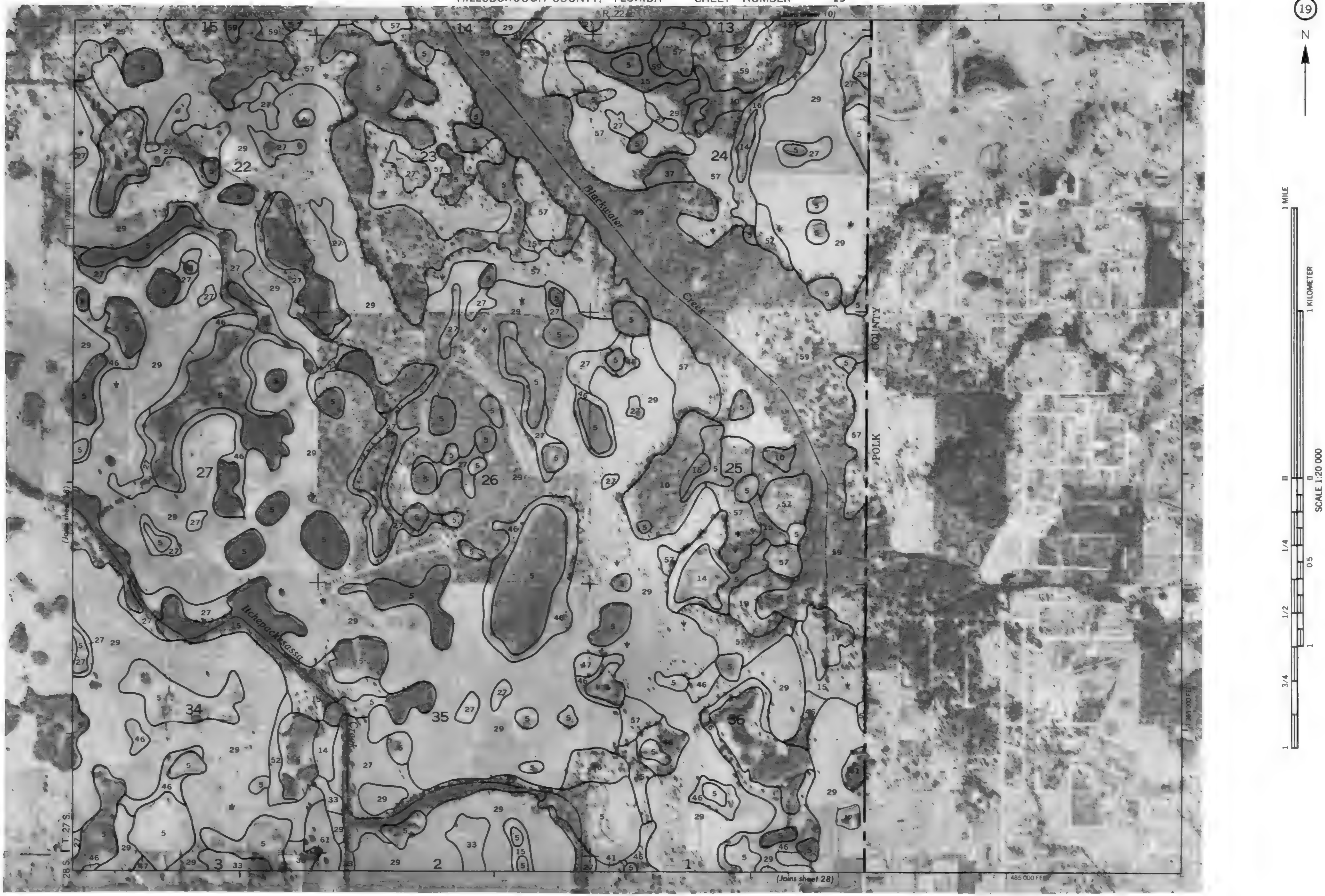

R. 21 E.
(Joins sheet 8)
Two Hole Branch
Clay Gully
Hollomans Branch
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 26)
T. 28 S.


17
N
1 MILE
1 KILOMETER
SCALE 1:20 000

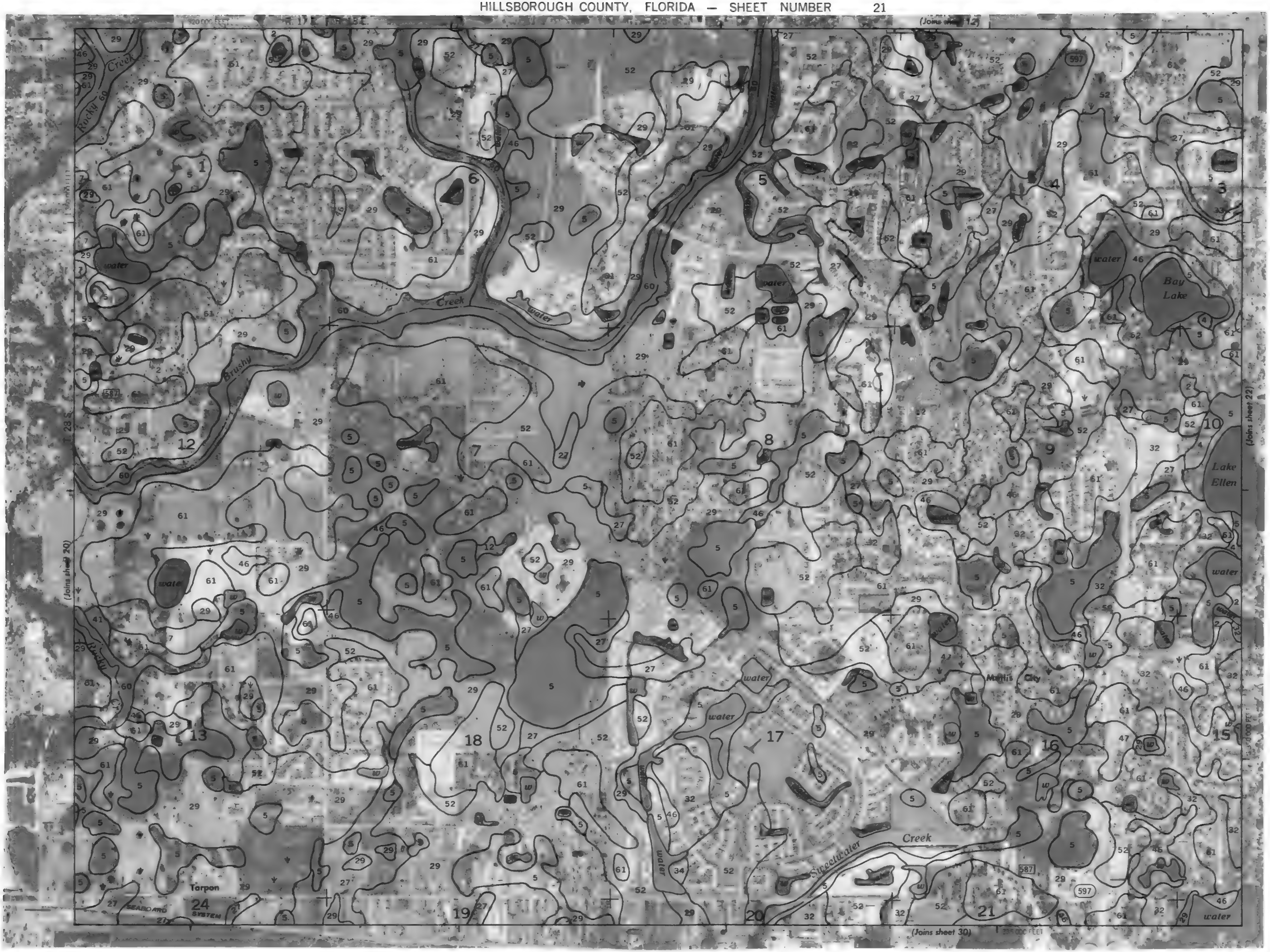
HILLSBOROUGH COUNTY, FLORIDA — SHEET NUMBER 18

N

1 MILE
1 KILOMETER
SCALE 1:20 000
0 1/4 1/2 3/4 1
0 0.5 1


19
N
(Joins sheet 10)
R. 22 E.
Blackwater
Creek
Itchepackesassa
Creek
COUNTY
POLK
(Joins sheet 18)
T. 27 S.
28 S.
(Joins sheet 28)
485 000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000


20
N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 11)
R. 17 E.
(Joins inset B sheet 1)
(Joins sheet 21)
(Joins sheet 29)
T. 28 S.
Hixon Lake
Citrus Park
Double Branch
Rocky Creek
water



21

N

1 MILE

1 KILOMETER

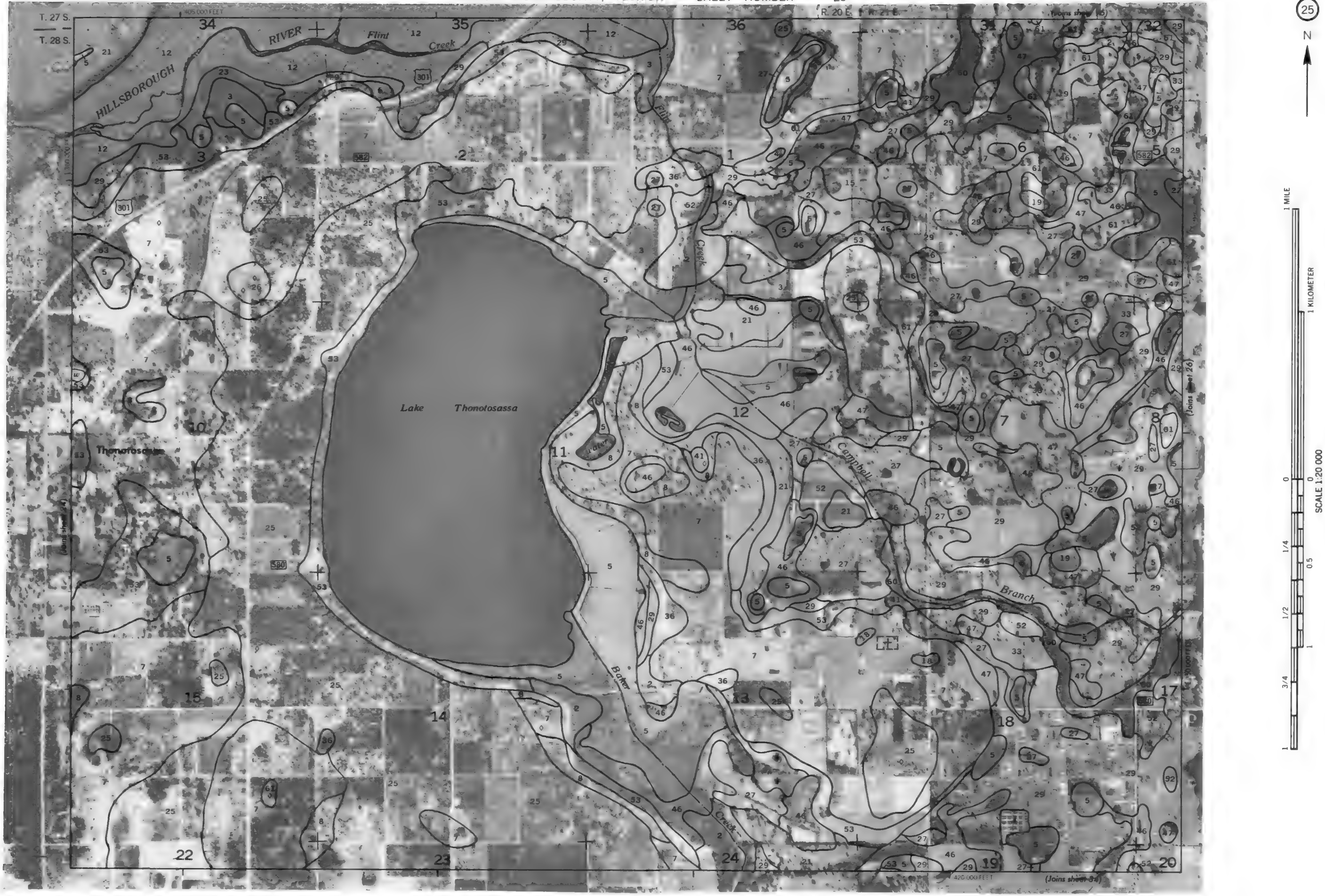
SCALE 1:20 000

(22)

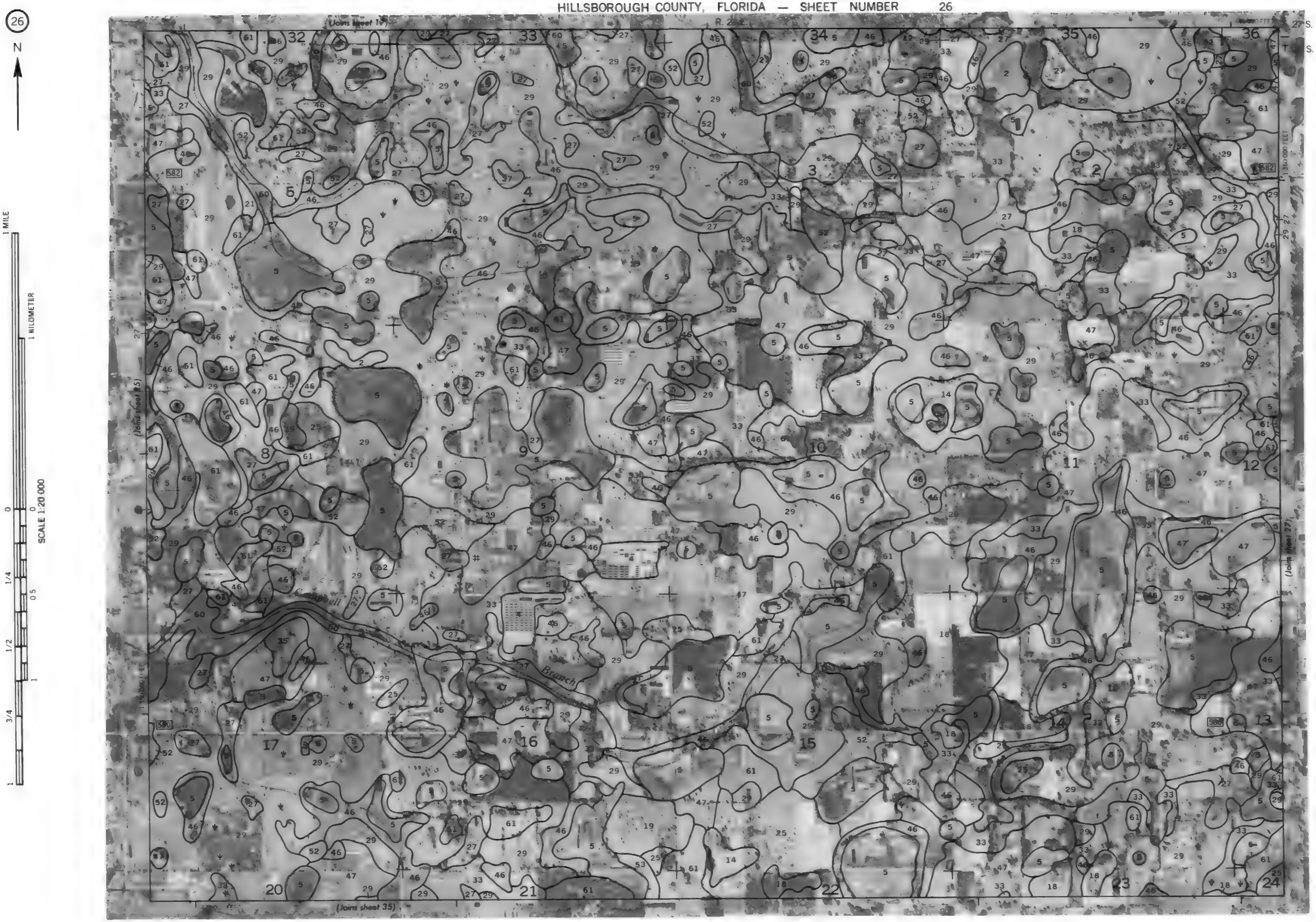

N
1 MILE
1 KILOMETER
SCALE 1:20 000
R. 18 E. | R. 19 E.
T. 28 S.
Lake Magdalene
Lake Senac
West Lake
Dorset Lake
Cedar Lake
Norcast Lake
Pine Lake
Lake Ellen
Lake Carroll
Boat Lake
White Trout Lake
TAMPA
Flora
Hillsboro
SEABOARD
water
(Joins sheet 21)
(Joins sheet 23)


23
N
R. 19 E.
T. 27 S.
T. 28 S.
(Joins sheet 14)
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 32)
Cypress Creek
Buck Hammock
HILLSBOROUGH RIVER
UNIVERSITY OF SOUTH FLORIDA
TAMPA
TEMPLE TERRACE
water
581
582A
582
583
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5

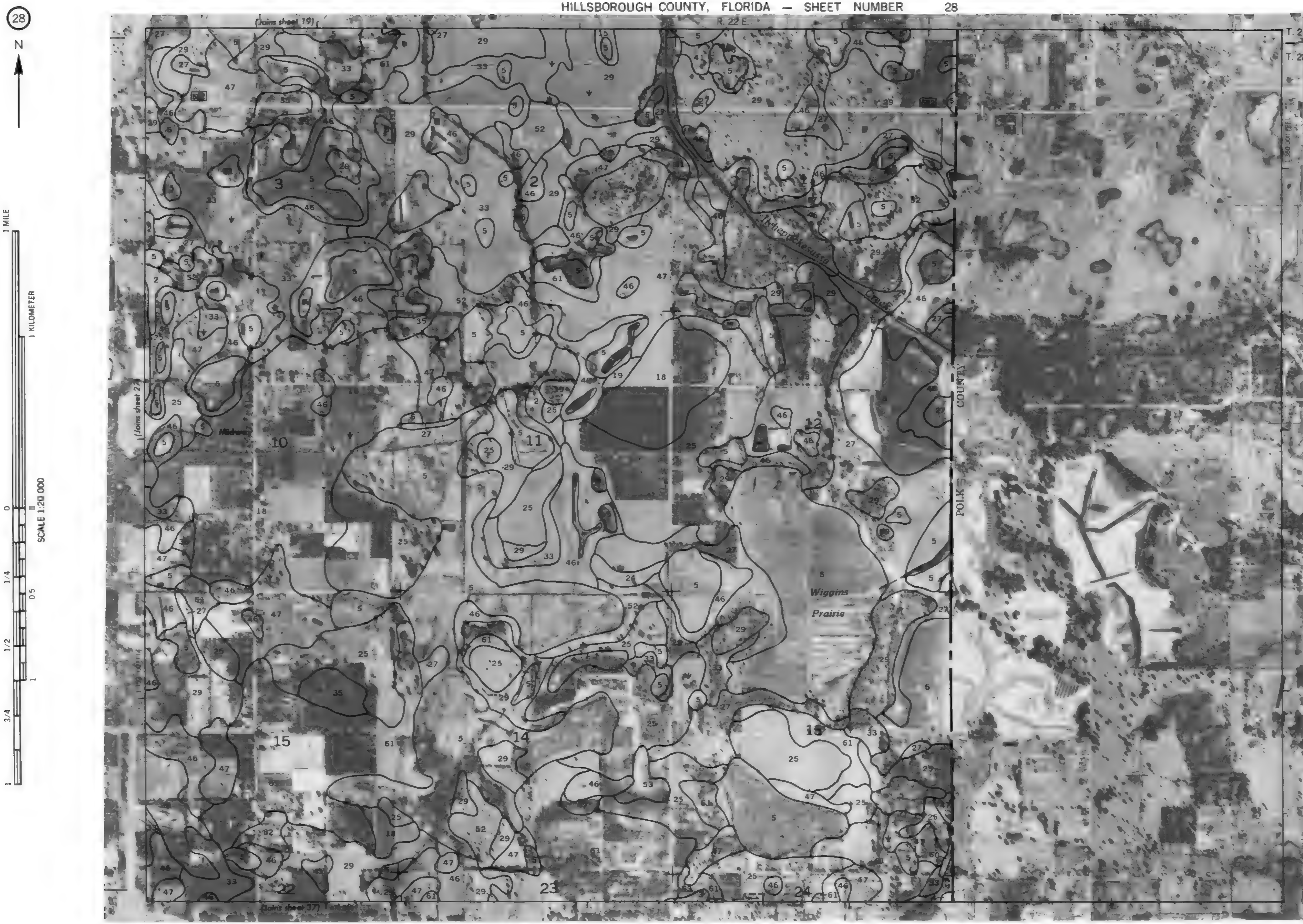

24
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5
HILLSBOROUGH R.
HILLSBOROUGH RIVER
Cow House Creek
TAMPA BYPASS CANAL
Thonotosassa
Clarkwild
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 33)
PROPOSED
579
582
582A
301
75



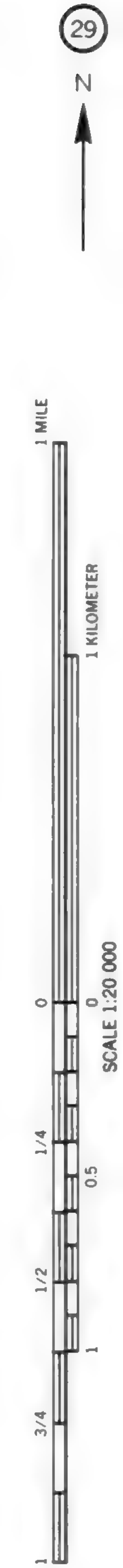
25
N
T. 27 S.
T. 28 S.
R. 20 E.
R. 21 E.
HILLSBOROUGH
RIVER
Flint
Creek
Lake Thonotosassa
Thonotosassa
Campbell
Branch
Baker
Creek
(Joins sheet 26)
1 MILE
1 KILOMETER
SCALE 1:20 000


26
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 19)
(Joins sheet 35)
(Joins sheet 25)
(Joins sheet 27)
R. 21 E.
27 S.
T.
Campbell
Branch
582
580


27
N
(Joins sheet 18)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 36)
T. 27 S.
T. 28 S.
R. 21 E. | R. 22 E.
Kilgore
Knights
East Canal
Pemberton Creek
water
1 MILE
1 KILOMETER
SCALE 1:20 000

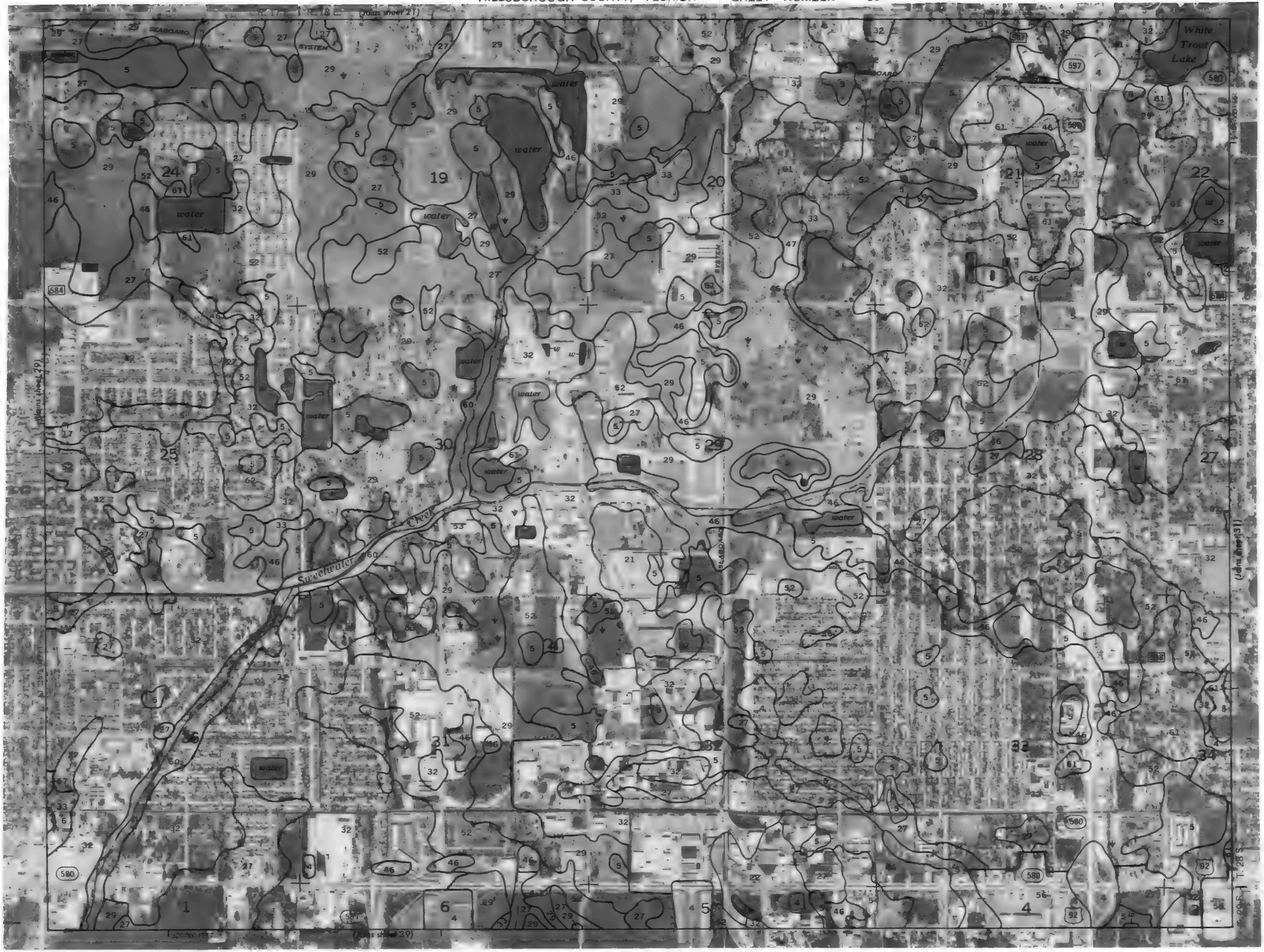

28
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5
R. 22 E.
T. 27 S.
T. 28 S.
(Joins sheet 19)
(Joins sheet 27)
(Joins sheet 37)
Itchepackesassa Creek
Wiggins Prairie
POLK COUNTY
10
11
12
13
14
15
22
23
24


Double Branch
Double Branch Bay
Mobbly Bay
Tarpon
Rocky Creek
Duck Creek
T. 29 S. | T. 28 S.


29
N
1 MILE
1 KILOMETER
SCALE 1:20 000

30

N

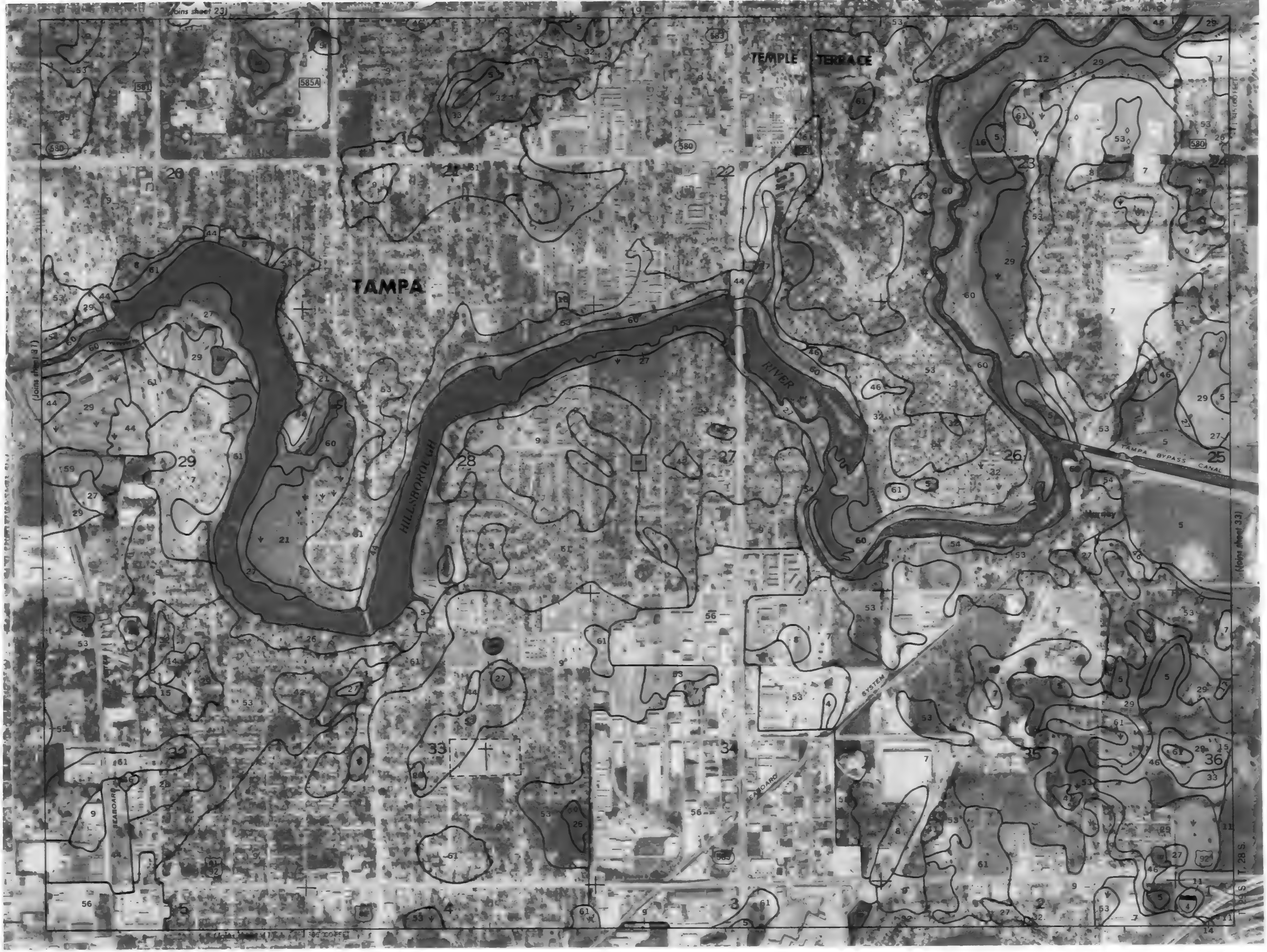


1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1


White Trout Lake
Big Twin Lake
Lake Silver
Egypt Lake
HILLSBOROUGH RIVER
TAMPA
R. 18 E. | R. 19 E.
T. 28 S.
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 40)
31
N
1 MILE
1 KILOMETER
SCALE 1:20 000
5000 FEET

(32)

N

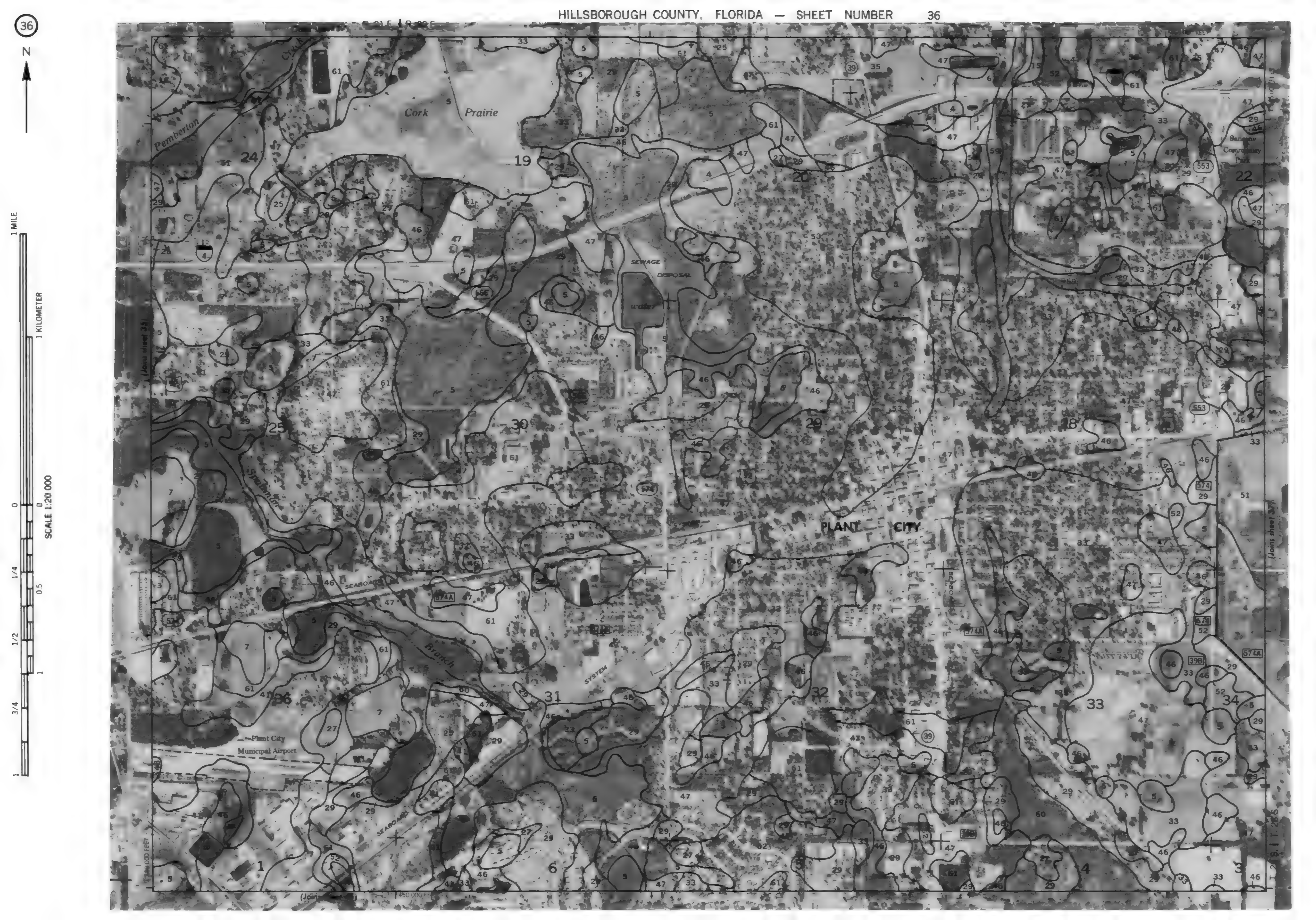


1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1

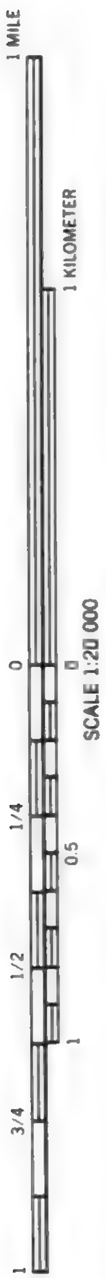

R. 19 E. | R. 20 E.
33
N
Harney Flats
Vandenberg Airport
CANAL
BYPASS
TAMPA
PROPOSED
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 42)
T. 29 S. | T. 28 S.
1 335 000 FEET
400 000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000


34
N
1 MILE
1 KILOMETER
SCALE 1:20 000
420 000 FEET
1 335 000 FEET
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 43)
SANITARY
LANDFILL
Hillsborough
Airport
Baker
Creek
water
T. 29 S. | T. 28 S.


35
N
Moore Lake
Dover
Pemberton
Creek
Spartman
Branch
SEABOARD
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 44)
1 MILE
1 KILOMETER
SCALE 1:20 000


36
N
1 MILE
0
1/4
1/2
3/4
1
1 KILOMETER
0
0.5
1
SCALE 1:20 000
Cork
Prairie
Pemberton
SEWAGE
DISPOSAL
water
PLANT
CITY
SEABOARD
Branch
SYSTEM
Plant City
Municipal Airport
(Joins sheet 35)
(Joins sheet 37)


STRIP
MINE
water
Miller
Airport (PVT)
POLK
COUNTY
(Joins sheet 36)
(Joins sheet 46)
T. 28 S.
T. 29 S.
574A
92
37
N
1 MILE
1 KILOMETER
SCALE 1:20 000

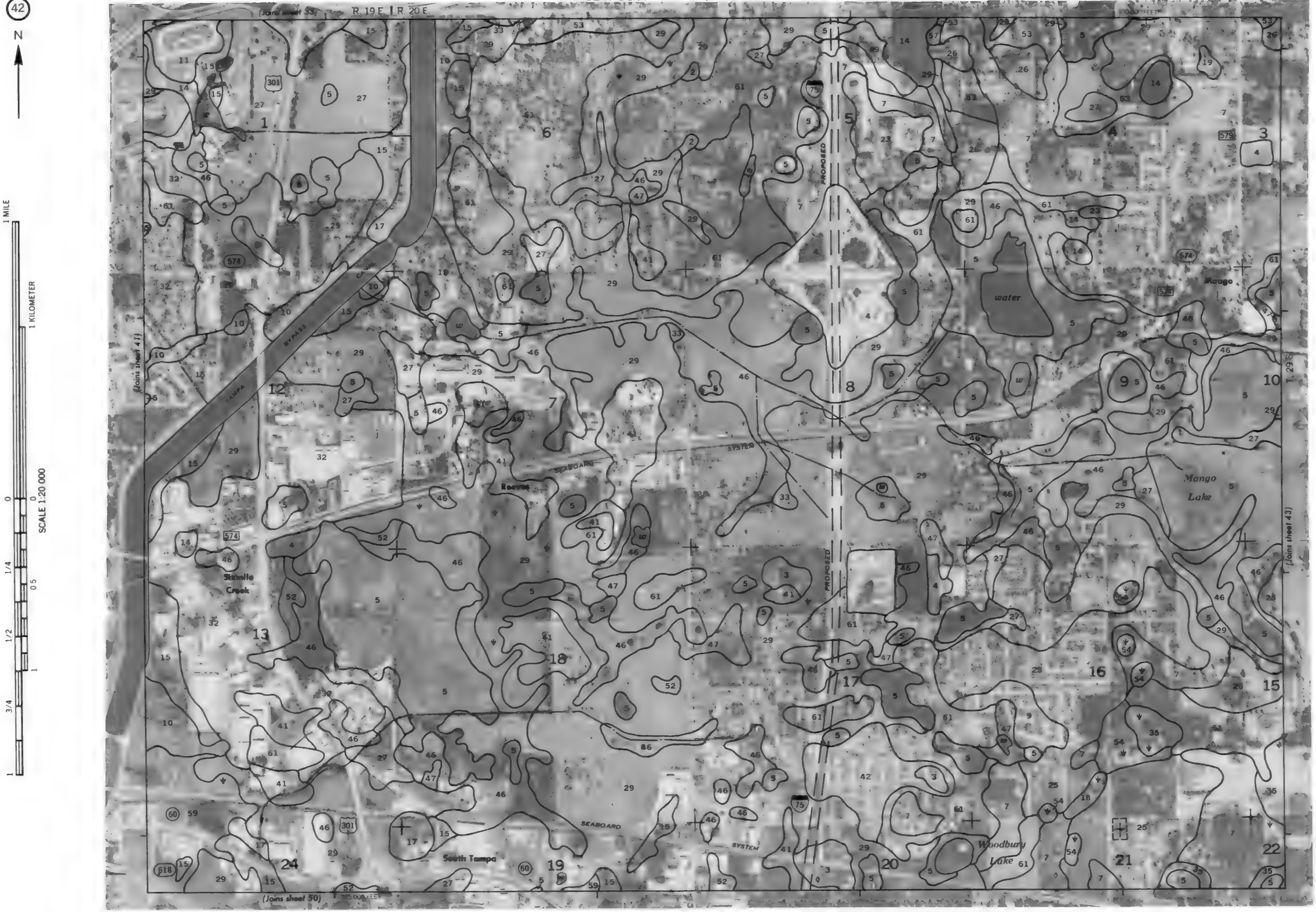

N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
1
3/4
1


Cabbagehead Bayou
Double Branch
Dick Creek
Rocky Creek
Woods Creek
Pepper Mound Creek
The Pond
OLD TAMPA BAY
COURTNEY CAMPBELL PARKWAY
Rocky Point
(Joins inset A, lower right)
(Joins sheet 39)
29 S.
INSET A
COURTNEY
CAMPBELL
PARKWAY
(Joins upper left)
292 000 FEET
2000 AND 5000-FOOT GRID TICKS
INSET B
(Joins sheet 71)
2000 AND 5000-FOOT GRID TICKS
1 315 000 FEET
300 000 FEET


39
N
TAMPA INTERNATIONAL AIRPORT
OLD TAMPA BAY
TAMPA
Sweetwater Cr
Fish Creek
water
(Joins sheet 30)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 47)
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


40
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
1
3/4
1
TAMPA
HILLSBOROUGH
RIVER
YBOR CHANNEL
SEABOARD
SYSTEM
(Joins sheet 31)
(Joins sheet 48)
(Joins sheet 39)
(Joins sheet 41)
R. 18 E. R. 19 E.
460 000 FEET


41
N
TAMPA
Bellows Lake
Vega Pond
Lake Juan
McKAY BAY
PALM RIVER
Orient Park
Uceta Yard
SEABOARD
(Joins sheet 32)
(Joins sheet 42)
(Joins sheet 49)
(Joins sheet 40)
water
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


42
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5
(Joins sheet 33)
R. 19 E. | R. 20 E.
(Joins sheet 41)
(Joins sheet 43)
(Joins sheet 50)
T. 29 S.
TAMPA BYPASS CANAL
SEABOARD SYSTEM
PROPOSED
Reeves
Sixmile Creek
Mango
Mango Lake
water
Woodbury Lake
South Tampa


43
N
(Joins sheet 34)
R. 20 E. R. 21 E.
Lake Weeks
Lake Hooker
Seffner
Long Pond
Valrico Lake
Wee Lake
water
(Joins sheet 42)
(Joins sheet 44)
(Joins sheet 51)
SEABOARD SYSTEM
1 MILE
1 KILOMETER
SCALE 1:20 000

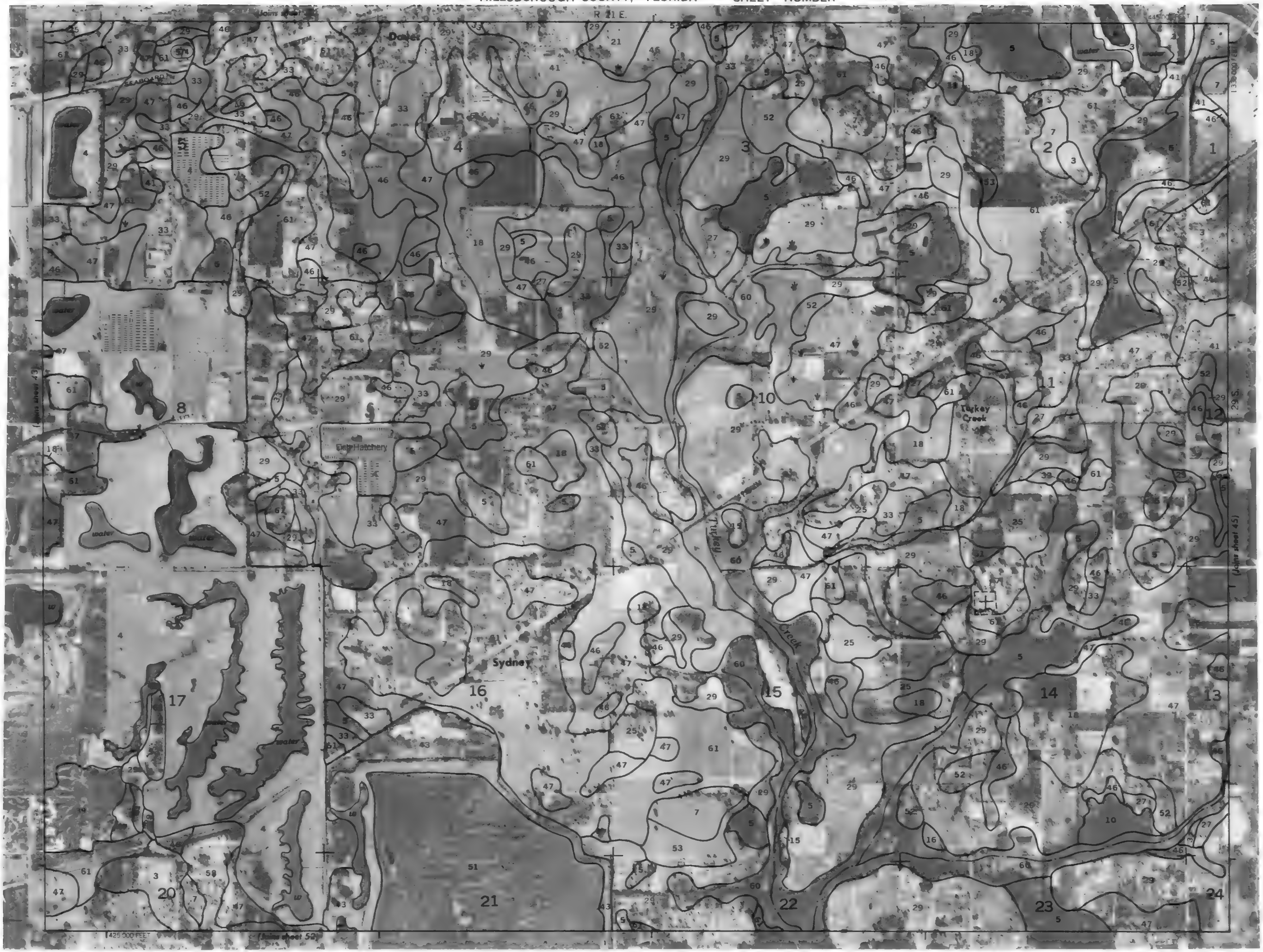
44

N

1 MILE

1 KILOMETER

SCALE 1:20 000

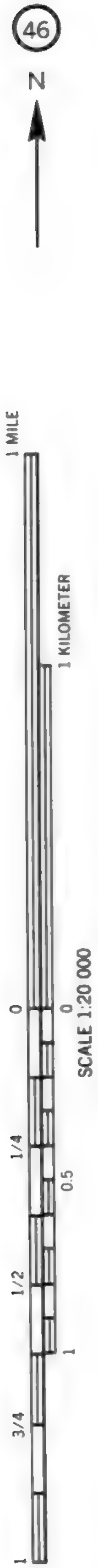


45

N

1 MILE
1 KILOMETER
SCALE 1:20 000

HILLSBOROUGH COUNTY, FLORIDA — SHEET NUMBER 46



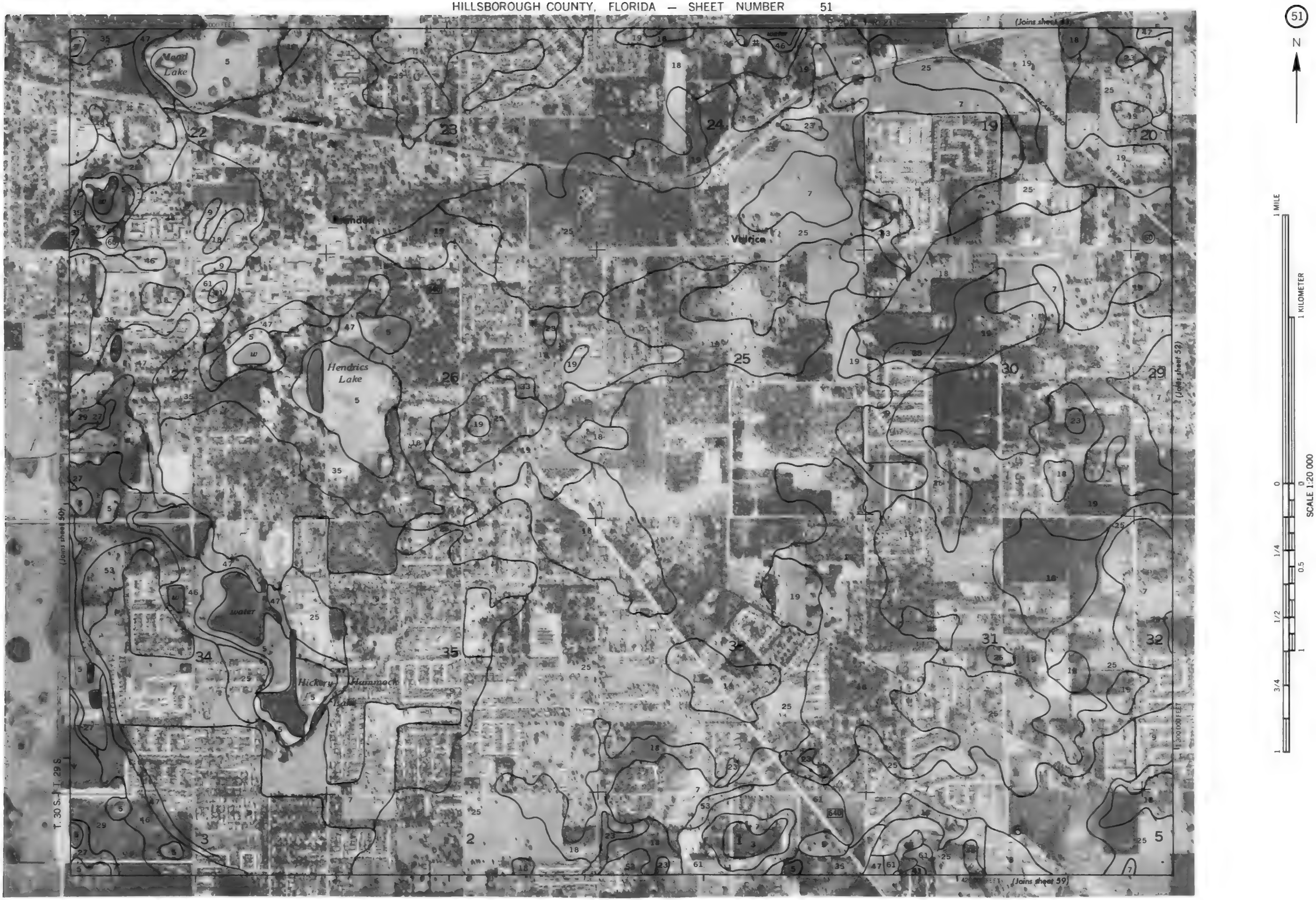

47
N
TAMPA
INTERBAY
PENINSULA
OLD TAMPA BAY
Culbreath Bayou
Gun Branch
GULF OF MEXICO
TAMPA BAY
Egmont Key
EGMONT KEY NATIONAL WILDLIFE REFUGE
T. 29 S.
T. 30 S.
R. 17 E.
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 55)

(48)


N
1 MILE
1 KILOMETER
SCALE 1:20 000
TAMPA
INTERBAY
PENINSULA
HILLSBOROUGH
BAY
Davis Island
Seddon Island
SEDDON CHANNEL
SPARKMAN CHANNEL
GARRISON CHANNEL
McKAY BAY
Hooker Point
Seaplane Basin
(Joins sheet 47)
(Joins sheet 56)
(Joins sheet 49)
T. 30 S.
22
23
24
19
20
26
27
25
30
29
36
34
3
32
55
56
58
45
46

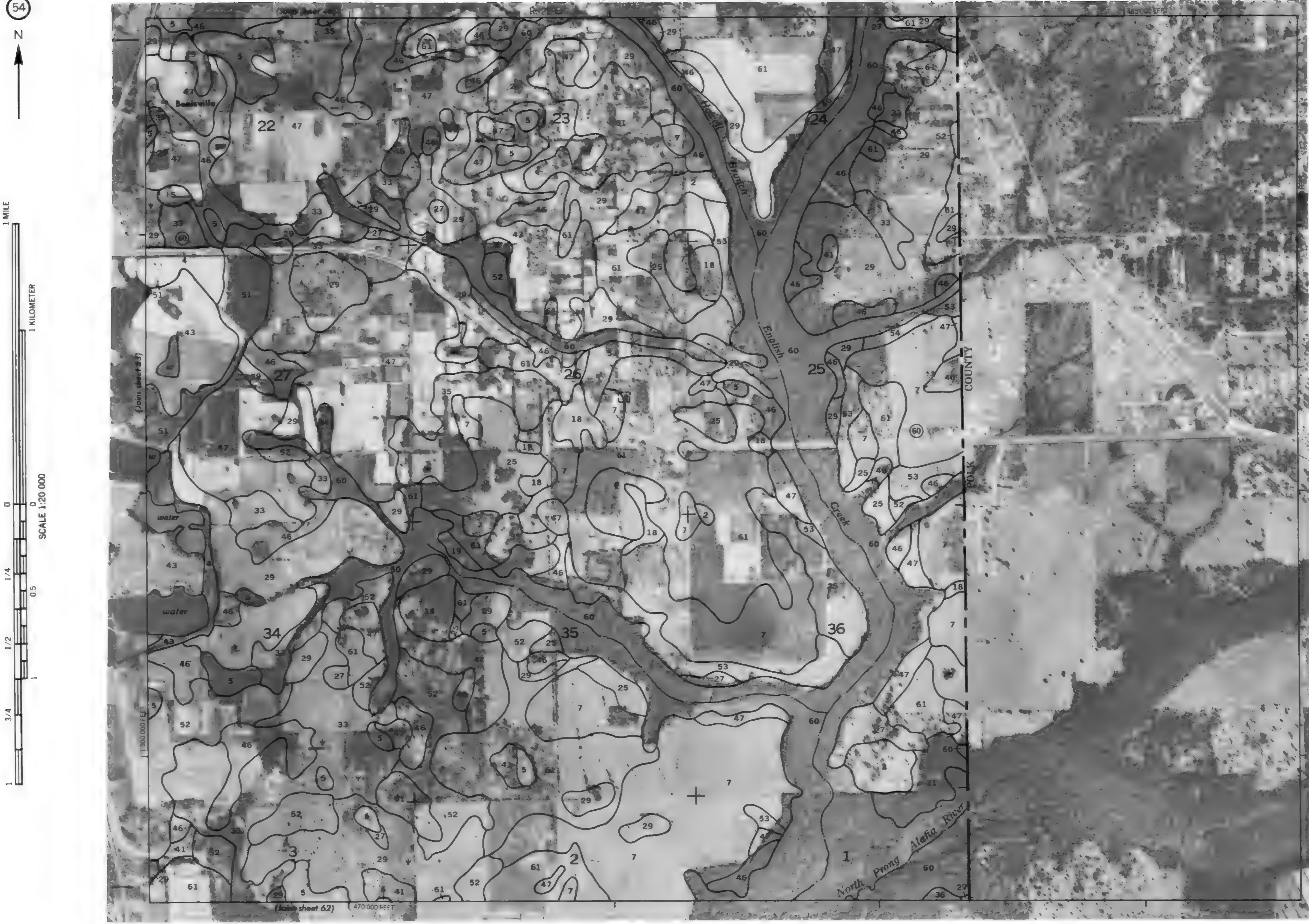

49
N
TAMPA
McKAY
BAY
EAST
BAY
PALM
RIVER
Rock Port
Creek
Delaney
Black
Point
(Joins sheet 41)
(Joins sheet 50)
(Joins sheet 57)
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


50
N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 42)
(Joins sheet 58)
South Tampa
Gornto Lake
Chapman Lake
Tenmile Lake
Sand Pond
SEABOARD
SYSTEM
PROPOSED
water
385 000 FEET
T. 30 S. | T. 29 S.


51
N
(Joins sheet 43)
Hendrics Lake
Hickory Hummock Lake
Valrico
Brandon
SEABOARD
SYSTEM
(Joins sheet 52)
(Joins sheet 59)
(Joins sheet 50)
T. 30 S. | T. 29 S.
1 MILE
1 KILOMETER
SCALE 1:20 000


52
N
1 MILE
1 KILOMETER
SCALE 1:20 000
SEABOARD
SYSTEM
Sucarnoochee
Lake
(Joins sheet 60)
(Joins sheet 51)
(Joins sheet 53)
425 000 FEET

HILLSBOROUGH COUNTY, FLORIDA — SHEET NUMBER 53


54
N
1 MILE
1 KILOMETER
SCALE 1:20 000
Bonnieville
Hassell Branch
English Creek
North Prong Alafia River
POLK COUNTY
water
(Joins sheet 53)
(Joins sheet 62)
470 000 FEET
1 300 000 FEET
T. 29 S.
T. 30 S.


55
N
OLD TAMPA BAY
TAMPA BAY
TAMPA
INTERBAY PENINSULA
MACDILL AIR FORCE BASE
Port Tampa
Sewage Disposal
(Joins sheet 47)
(Joins sheet 56)
(Joins sheet 63)
320 000 FEET
335 000 FEET
1 295 000 FEET
30 S.
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


56
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
1
3/4
1
(Joins sheet 48)
360 000 FEET
1 295 000 FEET
T. 30 S.
(Joins sheet 55)
(Joins sheet 57)
INTERBAY PENINSULA
TAMPA
Ballast Point
HILLSBOROUGH BAY
MACDILL AIR FORCE BASE
22
3
10
11
14
15
27
32
33
42
44
4
55
56
water

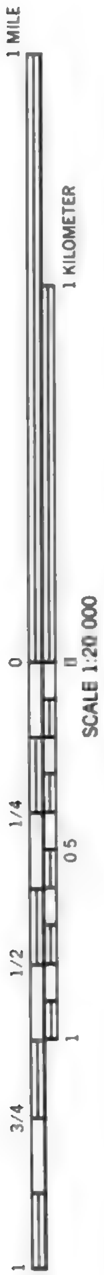

57
N
(Joins sheet 49)
(Joins sheet 58)
(Joins sheet 56)
(Joins sheet 65)
HILLSBOROUGH
BAY
Archie Creek
ALAFIA
RIVER
East Tampa
water
41
676A
T. 30 S.
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1

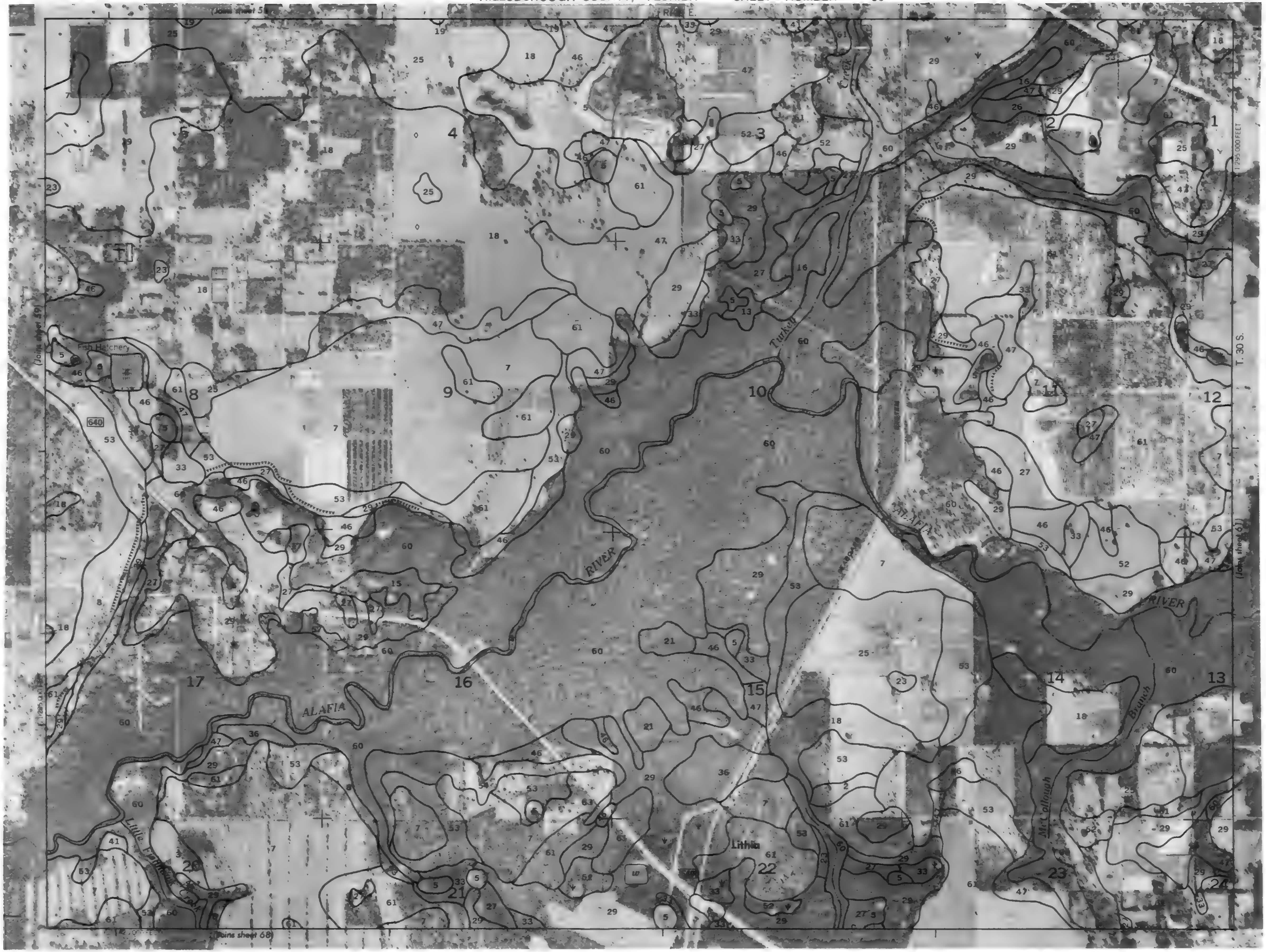

N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 50)
R. 19 E. | R. 20 E.
400 000 FEET
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 66)
385 000 FEET
1 285 000 FEET
T. 30 S.
Brandon Airport
Buckhorn Spring
Buckhorn
Creek
Riverview
ALAFIA
RIVER
water
PROPOSED


59
N
(Joins sheet 51)
R. 20 E. R. 21 E.
T. 30 S.
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 67)
Buckhorn
Creek
ALAFIA
RIVER
ALAFIA
RIVER
640
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1

60

N


1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
3/4
1


(Joins sheet 51)
R 20 E.
Fish Hatchery
640
Turkey
Creek
ALAFIA
RIVER
Lithia
McCullough
Branch
Little Fishhawk Creek
(Joins sheet 68)
(Joins sheet 59)
(Joins sheet 61)
T. 30 S.
1 295 000 FEET


61
N
ALAFIA
RIVER
Alafia River
North Prong
South Prong
Alafia River
water
SEABOARD
SYSTEM
(Joins sheet 53)
(Joins sheet 60)
(Joins sheet 62)
(Joins sheet 69)
1 MILE
1 KILOMETER
SCALE 1:20 000


N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 54)
R. 22 E.
(Joins sheet 61)
(Joins sheet 70)
English Cr.
River
Alafia
Thirtymile Creek
Prong
North
Sloman
Branch
POLK COUNTY
Keysville


63
N
INTERBAY
PENINSULA
MACDILL
AIR FORCE
BASE
Picnic Island
Picnic Island Creek
Broad Creek
water
TAMPA
BAY
19
20
21
22
27
28
29
30
32
33
34
(Joins sheet 64)
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


64
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
1
3/4
1
(Joins sheet 56)
R. 18 E. | R. 19 E.
360 000 FEET
1 280 000 FEET
(Joins sheet 63)
(Joins sheet 65)
340 000 FEET
T. 31 S. | T. 30 S.
MACDILL
AIR FORCE
BASE
INTERBAY
PENINSULA
Catfish Point
Gadsden Point
Broad
Creek
HILLSBOROUGH
BAY
water
55
56
22
23
45
56
29
56
27
45
29
29
26
41
56
45
27
58
45
29
41
35
58
45
27
45
30
45
45
34
27
45
30
30
30
30
30
27
44
41
4
4

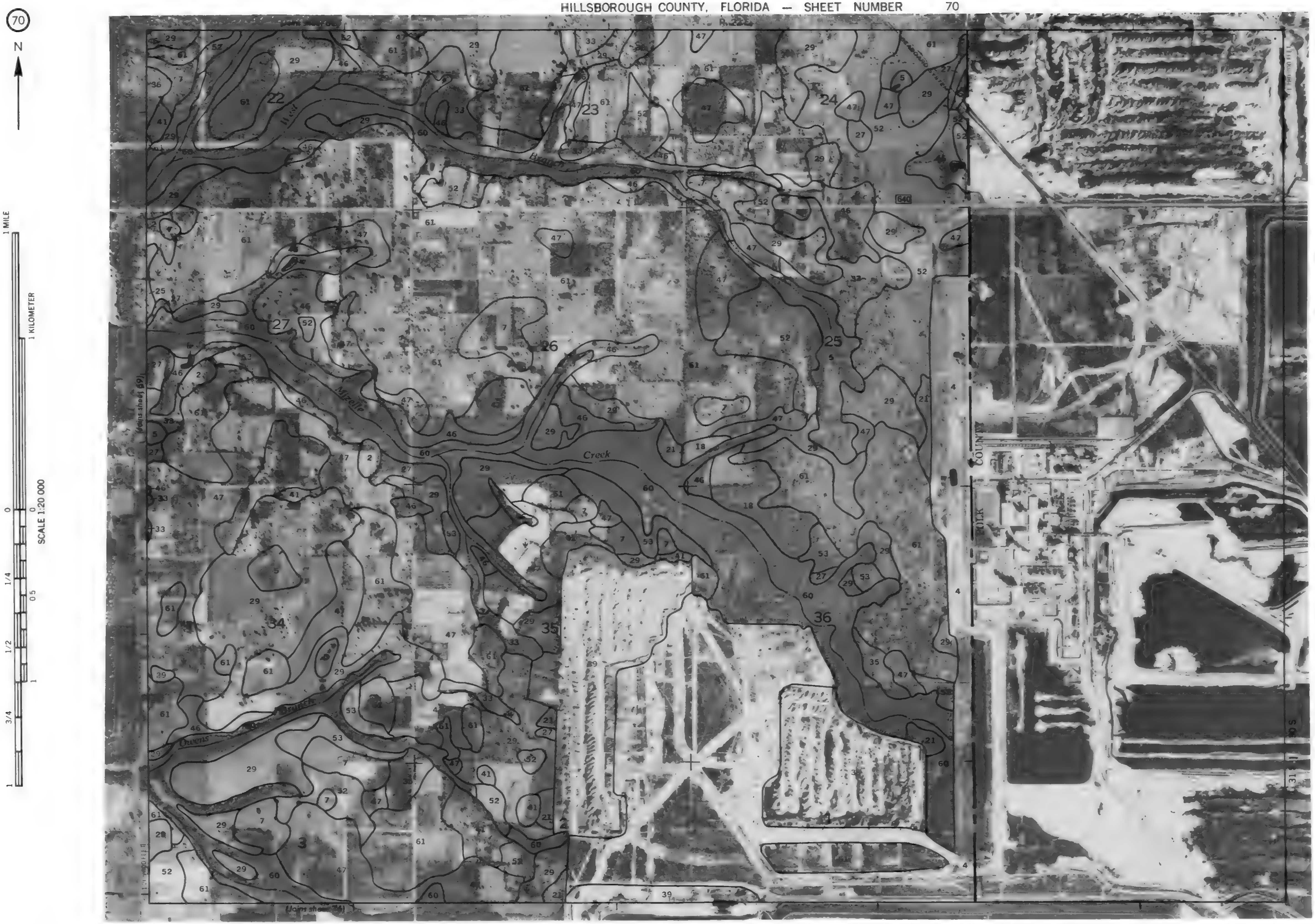

(Joins sheet 57)
ALAFIA
RIVER
water
Gibsonton
Bird Island
Sunken Island
HILLSBOROUGH
BAY
SOUTH CHANNEL
SEABOARD
Creek
Fish Hatchery
(Joins sheet 66)
Bullfrog
(Joins sheet 64)
Hog and Hominy Cove
The Kitchen
Whisky Stump Key
(Joins sheet 71)
T. 31 S.
T. 30 S.
1 270 000 FEET
380 000 FEET
65
N
1 MILE
1 KILOMETER
SCALE 1:20 000


66
N
1 MILE
1 KILOMETER
SCALE 1:20 000
ALAFIA
RIVER
Fish Hatchery
Bullfrog Creek
Rice Creek
(Joins sheet 72)
(Joins sheet 67)
(Joins sheet 65)
(Joins sheet 60)
R. 19 E. R. 20 E.
T. 31 S. T. 30 S.
water

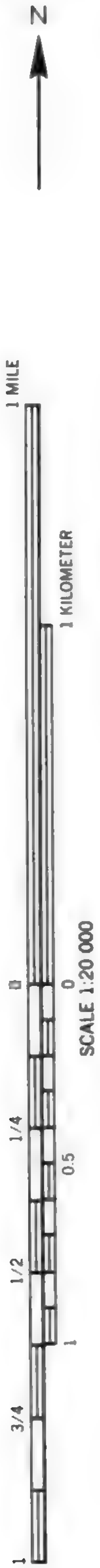

67
N
(Joins sheet 59)
(Joins sheet 66)
(Joins sheet 68)
(Joins sheet 73)
ALAFIA RIVER
Bell Creek
Fishhawk Creek
Hunt Lake
water
Branch
Pelleham
Bell Creek
Bogguy Creek
T. 31 S. | T. 30
420 000 FEET
1 265 000 FEET
1 280 000 FEET
405 000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000


68
N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 60)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 74)
Little Fishhawk Creek
Coleman Hammock
Fishhawk Creek
Chapman Hammock
Doe Branch
T. 30 S.
T. 31 S.


69
N
R. 21 E. R. 22 E.
(Joins sheet 61)
(Joins sheet 68)
(Joins sheet 70)
(Joins sheet 75)
Alafia River
South Prong
Mizelle Creek
West Branch
Owens Branch
Halls Branch
Chito Branch
water
1 MILE
1 KILOMETER
SCALE 1:20 000
465 000 FEET


70
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
1
3/4
1
Mizelle
Creek
Branch
Owens
Branch
(Joins sheet 69)
(Joins sheet 74)
POLK COUNTY
640


(Joins sheet 65)
(Joins inset B sheet 38)
(Joins sheet 72)
(Joins sheet 77)
(Joins sheet 78)
(Joins sheet 78)
TAMPA
BAY
Whiskey Stump Key
Adamsville
Sims Branch
Big Bend
Newman Branch
North Ruskin
Apollo Beach
water
T. 31 S.
71
N
1 MILE
1 KILOMETER
SCALE 1:20 000

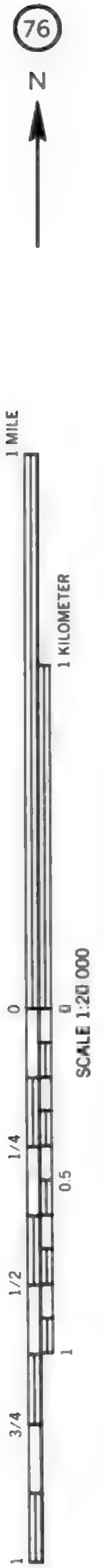

N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1

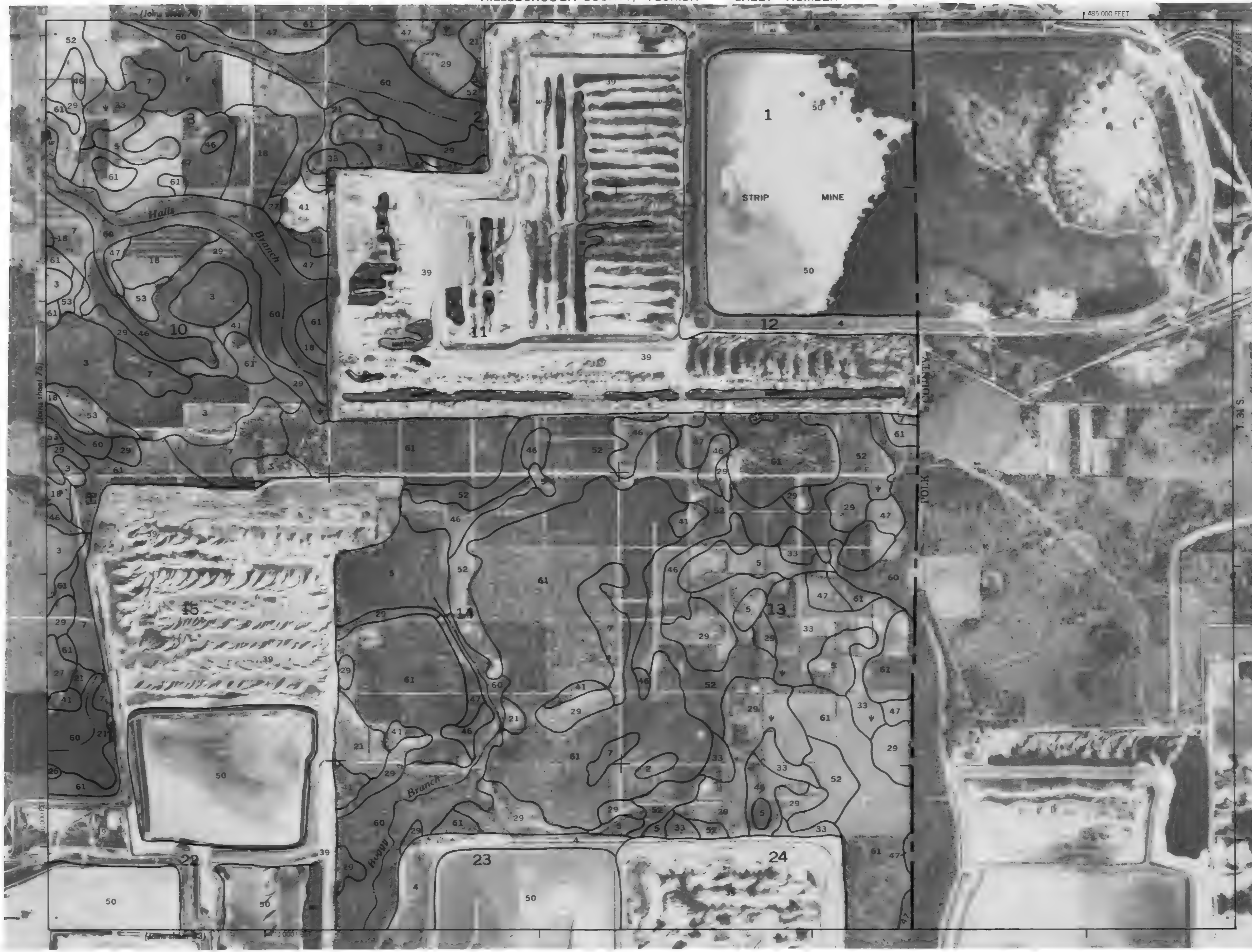

(Joins sheet 60)
R. 19 E.
R. 20 E.
PROPOSED
(Joins sheet 71)
(Joins sheet 73)
(Joins sheet 79)
T. 31 S.
water
water
water
Creek
Little
Bullfrog
Bullfrog
Creek
Creek
75
301
672


(Joins sheet 67)
(Joins sheet 72)
(Joins sheet 74)
(Joins sheet 80)
Branch
Boggy Creek
Bell Creek
Bullfrog Creek
SEABOARD SYSTEM
T. 31 S.
405 000 FEET
420 000 FEET
1 250 000 FEET
672
73
N
1 MILE
1 KILOMETER
SCALE 1:20 000


74
N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 68)
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 81)
R. 21 E.
T. 31 S.
Cabbage Hammock
Long Flat Creek
Doe Branch
Bell Creek
Pringle Branch
Stallion Hammock
SEABOARD SYSTEM
STRIP MINE
TAILINGS POND
water


75
N
R. 21 E.
R. 22 E.
(Joins sheet 69)
(Joins sheet 74)
(Joins sheet 76)
(Joins sheet 82)
465 000 FEET
Chito Branch
Alafia River
McMullen Branch
South Prong
Pollard Branch
STRIP MINE
TAILINGS POND
SEABOARD SYSTEM
Ullibridge
1 MILE
1 KILOMETER
SCALE 1:20 000


N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1


(Joins sheet 70)
(Joins sheet 75)
(Joins sheet 83)
485 000 FEET
STRIP MINE
Halls Branch
Bogus Branch
POLK COUNTY
T. 31 S.

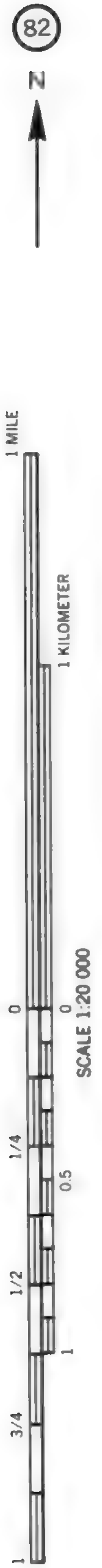

77
N
(Joins sheet 71)
(Joins sheet 78)
(Joins sheet 85)
340 000 FEET
1 245 000 FEET
1 235 000 FEET
R. 16 E.
PINELLAS
COUNTY
SUNSHINE
SKYWAY
(TOLL)
TAMPA BAY
4000 AND 5000-FOOT GRID TICKS
T. 31 S.
T. 32 S.
TAMPA BAY
Double Bayou Pass
Pelican Cove
Mangrove Point
Banana Creek
Crab Creek
Wolf Branch
water
1 MILE
1 KILOMETER
SCALE 1:20 000


78
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
0.5
1/2
1
3/4
Apollo Beach
Wolf Branch
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 86)
T. 32 S. | T. 31 S.
75
41
SEABOARD
SYSTEM
water
380 000 FEET
124 000 FEET


R. 19 E. | R. 20 E.
(Joins sheet 72)
(Joins sheet 78)
(Joins sheet 80)
(Joins sheet 87)
T. 32 S. | T. 31 S.
1 245 000 FEET
1 235 000 FEET
400 000 FEET
Bullfrog
Creek
Sun City
water
79
N
1 MILE
1 KILOMETER
SCALE 1:20 000


N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 79)
(Joins sheet 81)
Bullfrog
Creek
SEABOARD
Branch
T. 32 S. | T. 31 S.
R. 21 E.


81
N
(Joins sheet 74)
(Joins sheet 82)
(Joins sheet 89)
(Joins sheet 80)
R. 21 E.
T. 31 S.
Hurrah Bay
Lewis Branch
Pierce Branch
water
672
1 MILE
1 KILOMETER
SCALE 1:20 000


N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1


R. 21 E. | R. 22 E.
(Joins sheet 75)
465 000 FEET
(Joins sheet 81)
(Joins sheet 83)
(Joins sheet 90)
1 245 000 FEET
1 235 000 FEET
South Prong Alafia River
Hurrah Lake
Hurrah Creek
Lewis Branch
Buggy Water Branch
T. 31 S. | T. 32 S.


83
N
(Joins sheet 73)
(Joins sheet 82)
(Joins sheet 91)
470 000 FEET
1 245 000 FEET
POLK COUNTY
South Prong Alafia River
Lake Branch
Gully Branch
water
1 MILE
1 KILOMETER
SCALE 1:20 000


84
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1
R. 18 E.
335 000 FEET
(Joins inset B, sheet 11)
R. 17 E.
SEABOARD SYSTEM
Double Branch
580
PINELLAS COUNTY
Boat Bayou
Mobbly Bay
1 335 000 FEET
1 220 000 FEET
291 000 FEET
4000 AND 5000 FOOT GRID TICKS
320 000 FEET
(Joins sheet 92)
TAMPA BAY
COCKROACH BAY AQUATIC PRESERVE
Little Cockroach Rock Pass
Little Cockroach Island
Mags Hole
Little Cockroach Bay
Big Pass Key
Marys Point
Big Pass
Camp Key
Snake Key
Cockroach Bay
water
T. 32 S.
(Joins sheet 85)


(Joins sheet 77)
TAMPA
BAY
Sand Point
Shell Point
Negro Island
Sand Key
Whisky Key
Little Cockroach Bay
LITTLE
Devils Elbow
Goat Island
MANATEE
Pirate Point
Ruskin
Mill Bayou
RIVER
Hayes Bayou
Wildcat Cr.
water
(Joins sheet 84)
(Joins sheet 86)
(Joins sheet 93)
T. 32 S.
R. 18 E.
R. 19 E.
SEABOARD
SYSTEM
85
N
1 MILE
1 KILOMETER
SCALE 1:20 000


N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1

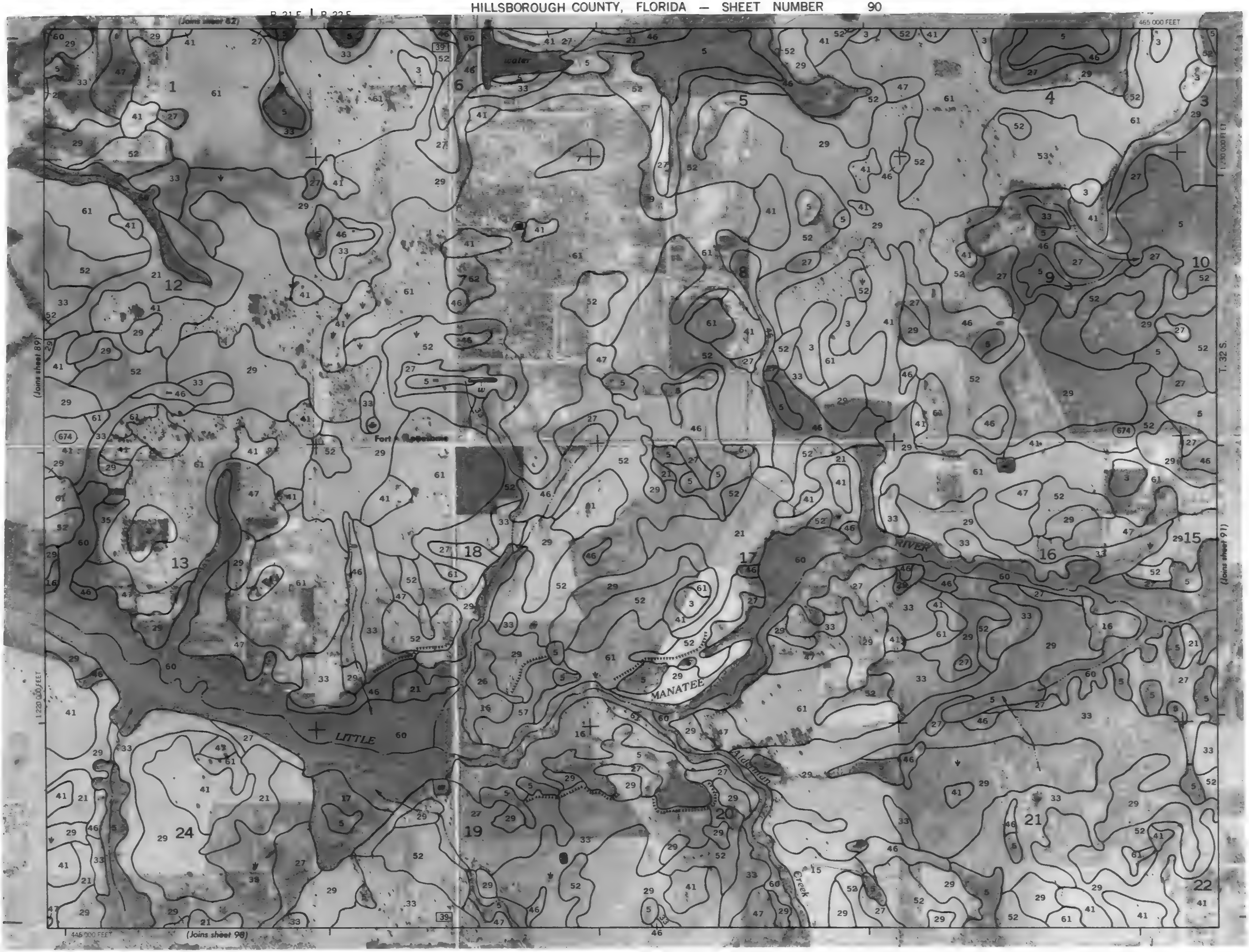

(Joins sheet 78)
R. 19 E.
380 000 FEET
Ruskin
Marsh
Branch
Wolf
Branch
Cypress
water
SYSTEM
Sun City Center Airport (PVT)
LITTLE MANATEE R
1 220 000 FEET
(Joins sheet 94)
(Joins sheet 87)
(Joins sheet 85)


R. 19 E. R. 20 E.
(Joins sheet 79)
(Joins sheet 86)
(Joins sheet 88)
(Joins sheet 95)
Sun City
Sun City Center
Lake Wimauma
Cypress Creek
Dug Creek
water
87
N
1 MILE
1 KILOMETER
SCALE 1:20 000

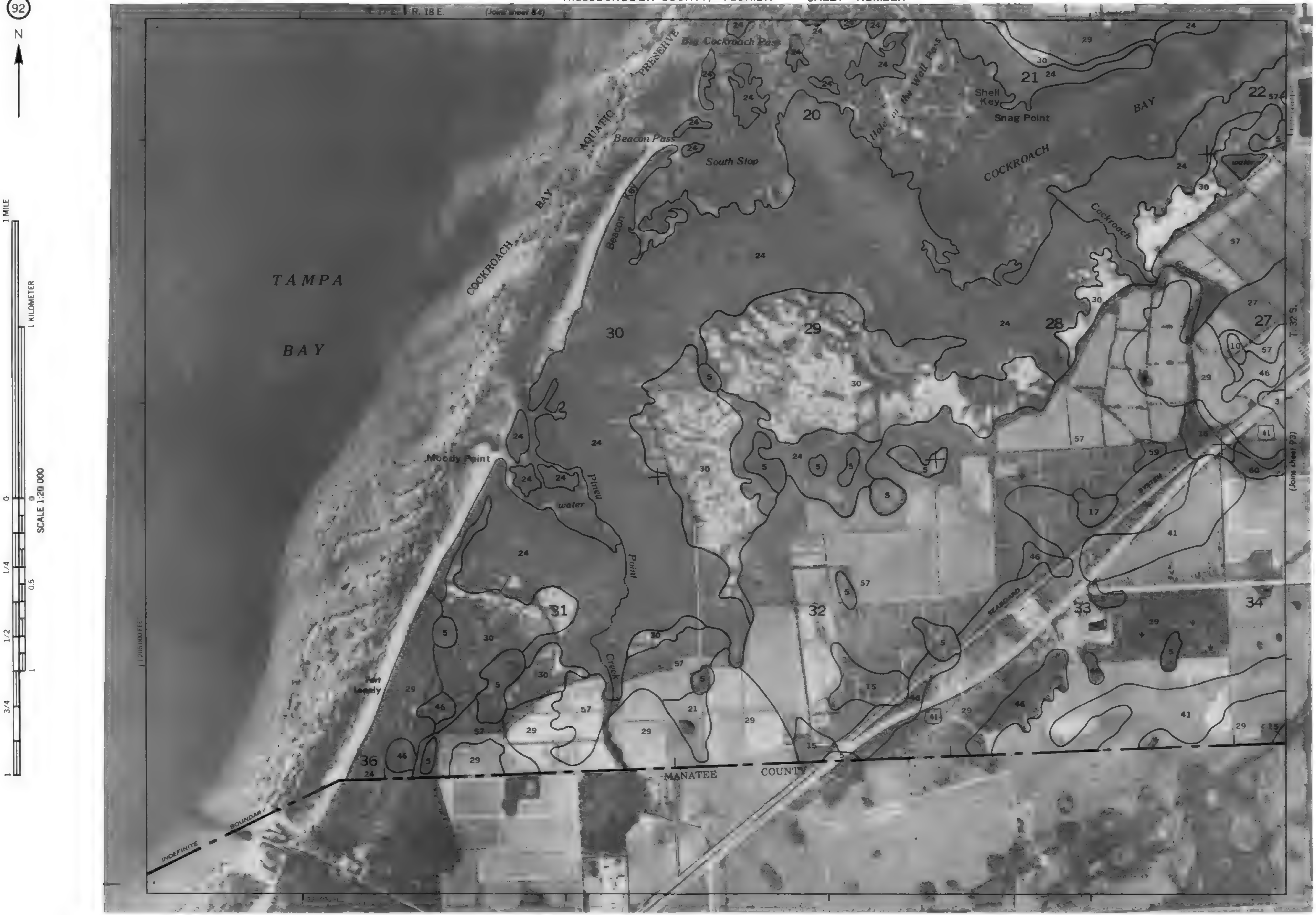

88
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0
0.5
1
Bullfrog
Creek
Anderson Airport (PVT)
Carlton Lake
Carlton
Branch
Gully
Branch
LITTLE
MANATEE
RIVER
420 000 FEET
230 000 FEET
T. 32 S.
R. 20 E.
R. 21 E.
(Joins sheet 89)
(Joins sheet 87)
(Joins sheet 96)
(97)
579
674
672


89
N
R. 21 E.
(Joins sheet 81)
(Joins sheet 90)
(Joins sheet 97)
(Joins sheet 88)
T. 32 S.
Pierce
Branch
LITTLE
MANATEE
RIVER
Howard
Prairie
Branch
674
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


90
N
1 MILE
1 KILOMETER
SCALE 1:20 000


(Joins sheet 82)
R. 21 E. | R. 22 E.
465 000 FEET
1 230 000 FEET
T. 32 S.
(Joins sheet 89)
(Joins sheet 91)
(Joins sheet 98)
1 220 000 FEET
446 000 FEET
water
Fort Lonesome
674
39
LITTLE
MANATEE
RIVER
Alderman
Creek


91
N
(Joins sheet 83)
South Prong Alafia River
LITTLE MANATEE RIVER
POLK COUNTY
(Joins sheet 90)
(Joins sheet 99)
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


92
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5
TAMPA
BAY
COCKROACH BAY AQUATIC PRESERVE
Big Cockroach Pass
Beacon Pass
South Stop
Beacon Key
Hole in the Wall Pass
Shell Key
Snag Point
COCKROACH BAY
Cockroach Creek
Moody Point
Piney Point Creek
water
Fort Lonely
SEABOARD SYSTEM
MANATEE COUNTY
INDEFINITE BOUNDARY
T. 32 S.
R. 18 E.
(Joins sheet 84)
(Joins sheet 93)
41
20
21
22
27
28
29
30
31
32
33
34
36
24
5
57
46
15
17
10
3
16
59
60


93
N
Hayes Bayou
Sun City
SEABOARD
SYSTEM
Wildcat Creek
LITTLE MANATEE RIVER
Bolster Bayou
Cockroach Creek
Curiosity Creek
MANATEE COUNTY
water
R. 18 E. | R. 19 E.
T. 32 S.
(Joins sheet 85)
(Joins sheet 92)
(Joins sheet 74)
340 000 FEET
350 000 FEET
1 215 000 FEET
1 205 000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000


94
N
1 MILE
1 KILOMETER
SCALE 1:20 000
380 000 FEET
360 000 FEET
1 315 000 FEET
1 205 000 FEET
T. 32 S.
LITTLE MANATEE RIVER
Bolster Bayou
Cypress Creek
MANATEE COUNTY


R. 19 E.
R. 20 E.
(Joins sheet 87)
(Joins sheet 94)
(Joins sheet 96)
T. 32 S.
Cypress Creek
Dug Creek
LITTLE MANATEE RIVER
South Fork
SEABOARD
SYSTEM
301
579
MANATEE COUNTY
N
1 MILE
1 KILOMETER
SCALE 1:20 000

96

N

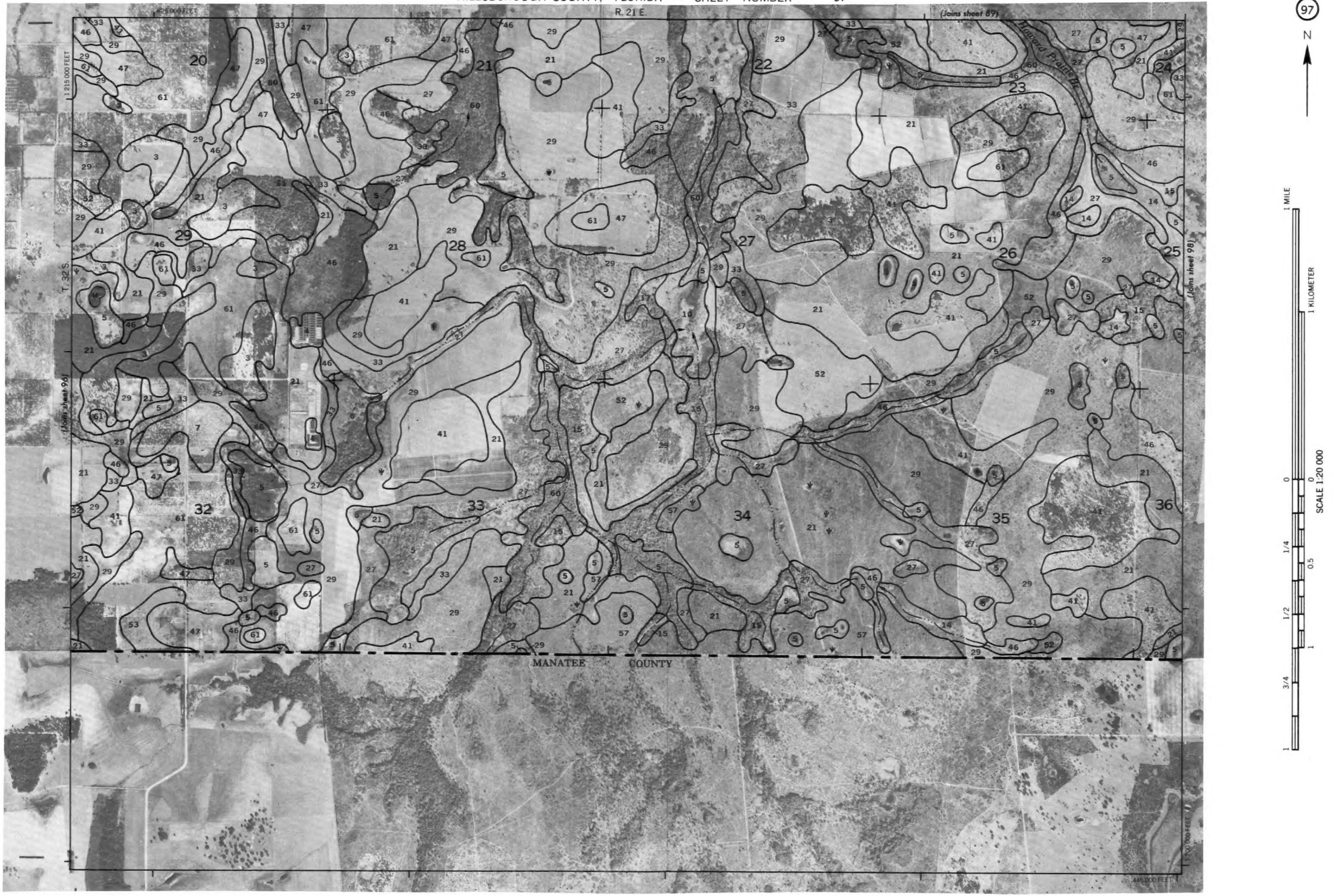
1 MILE

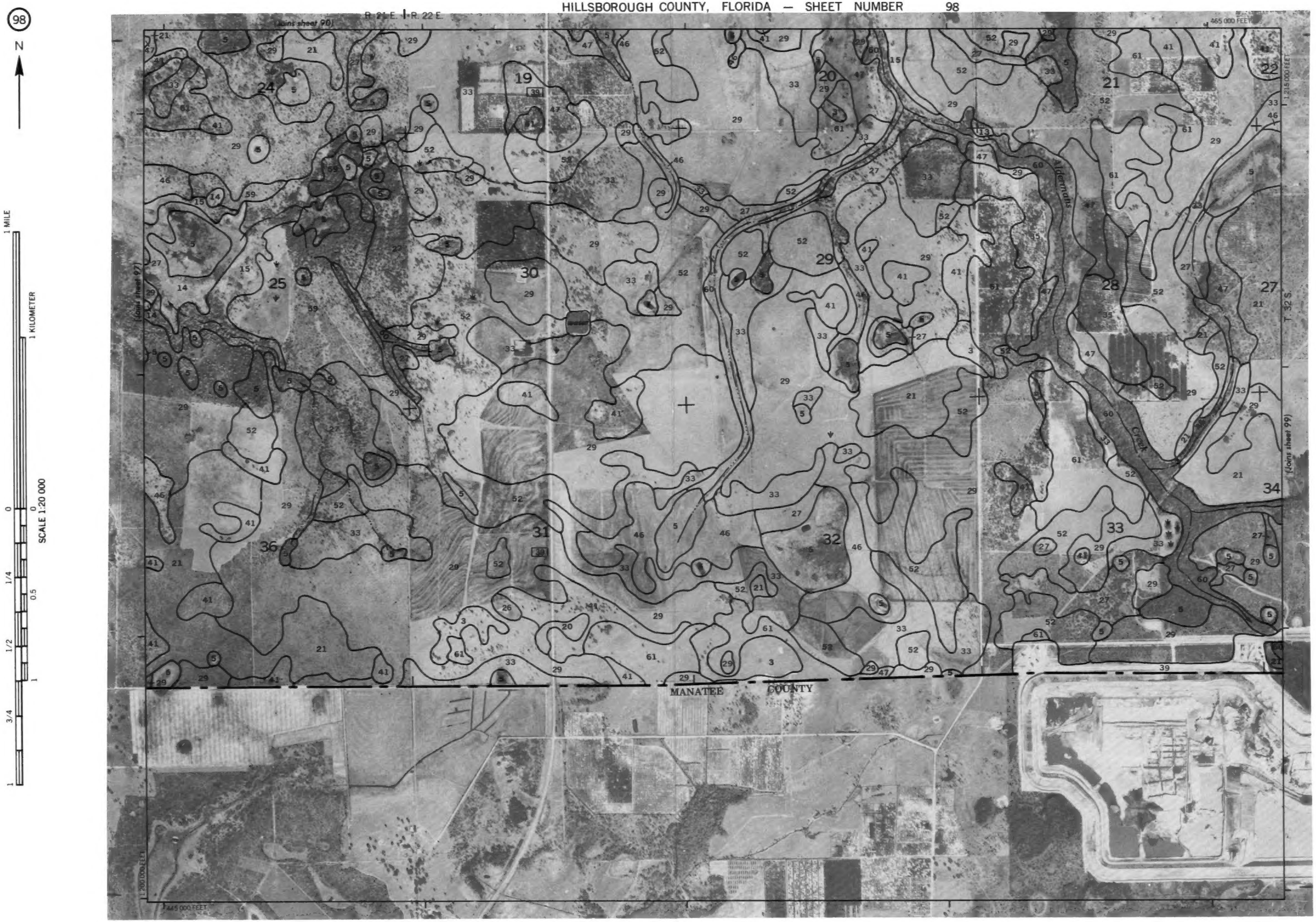
1 KILOMETER

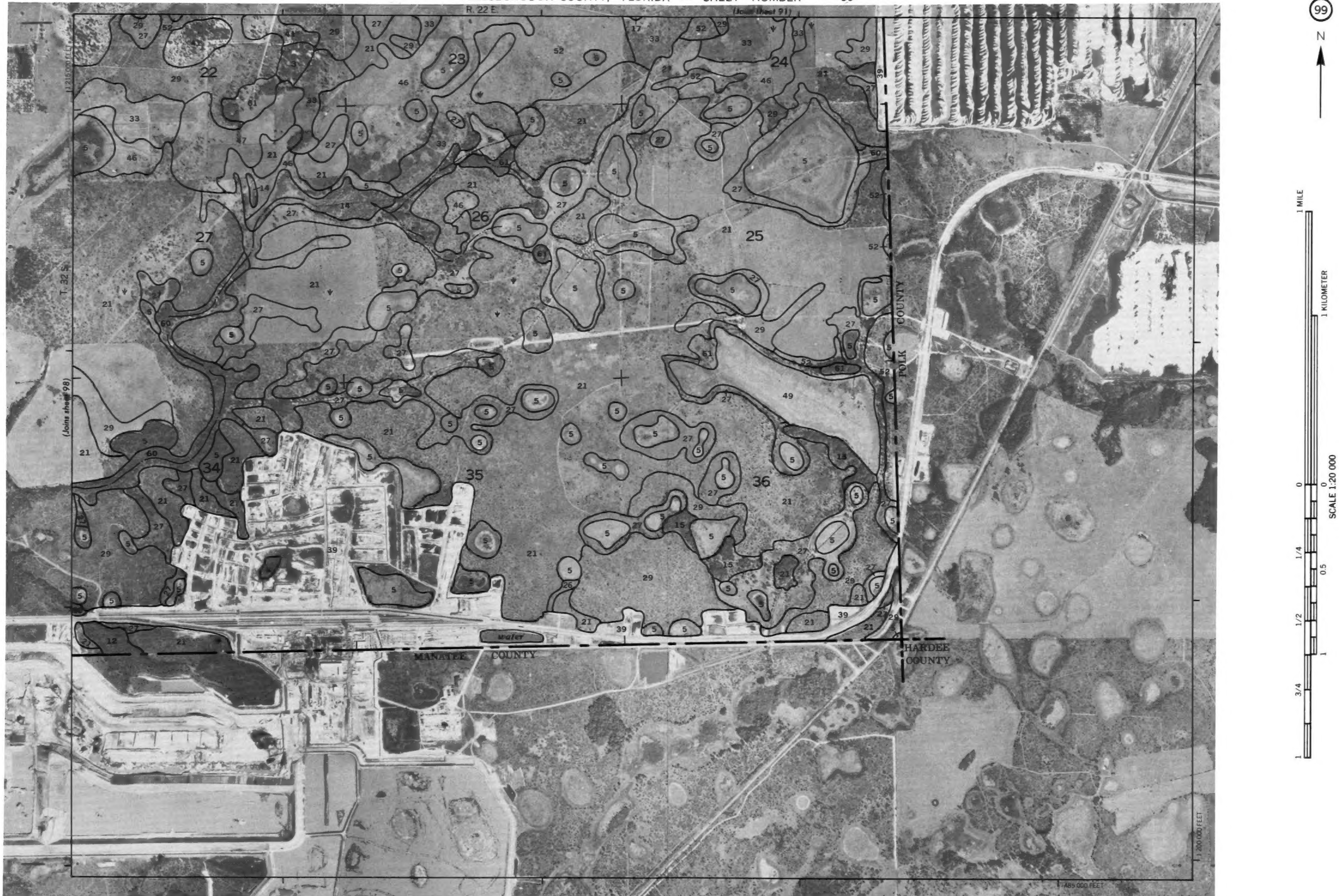
SCALE 1:20 000

0 1/4 1/2 3/4 1

0 0.5 1


R. 21 E.
(Joins sheet 89)
(Joins sheet 98)
(Joins sheet 96)
T. 32 S.
Howard Prairie Br.
MANATEE COUNTY
1 215 000 FEET
1 200 000 FEET
425 000 FEET
445 000 FEET
97
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


98
N
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5
R. 21 E.
R. 22 E.
(Joins sheet 90)
465 000 FEET
1 215 000 FEET
T. 32 S.
(Joins sheet 97)
(Joins sheet 99)
Aldermans
Creek
MANATEE
COUNTY
445 000 FEET
1 200 000 FEET


R. 22 E.
(Joins sheet 91)
(Joins sheet 98)
T. 32 S.
POLK COUNTY
MANATEE COUNTY
HARDEE COUNTY
water
1 210 000 FEET
1 200 000 FEET
485 000 FEET
99
N
1 MILE
1 KILOMETER
SCALE 1:20 000